NATURE MAGAZINE

gust-September 35 Cents Vol. 37, No. 7

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Motion pictures of Nature and the Outdoors will take you far and wide in the world of the wild.

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13. *Renting Houses for Songs:* An intimate study of bird life.

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24. *Thar She Blows:* Whales at sea.
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More on Mullets

Editor: Nature Magazine.

In the June-July 1944 issue (p. 332) reference is made to a supposedly new venture in accustoming the southern mullet to brackish and then to fresh water. That is something I know to have been been done previous to 1910 on St. Vincent Island, Florida, then the property of Dr. R. V. Pierce of Buffalo, N. Y. He had dammed the outlet of a series of ponds, extending into the island for miles, so that the water would freshen sufficiently to allow the growth of certain wild duck food plants. This object had been achieved and there was a good stand of the plants at the time, indicating that the inflow of salt water had been stopped for at least a few years. At high tide, however, there appeared to be some seepage of salt water through the wooden dam and mullets congregated there apparently to taste it. They were in such numbers that a single throw of a cast net would obtain many of them from which a selection could be made for table use. As this process probably had been going on for some time and the number of mullets was still large, it would indicate that they had been reproducing.

W. L. McAtee.

Nature in Hawaii

In the same mail that a copy of *Birds of Hawaii* by George C. Munro came to us for review, we received a copy of the first issue of the bulletin of the Naturalists' Society of Hawaii, of which Charles M. Dunn is president. This organization is dedicated to conservation of the natural resources of the Islands. One interesting article in this bulletin—entitled *The Hawaiian Naturalist*—is by E. H. Bryan, Jr., urging that Hawaii's natural history be popularized. He points out that it is well known to scientists, but material available is largely in scientific terms. Up to 1915 there was no general natural history of Hawaii, and the book by William Alanson Bryan, produced at that time, has long been out of print and its republication would require revision. Hawaiian flora has been quite well covered by recent books but no other branch of natural history has been as fortunate. Mr. Bryan urges emphasis on more popular texts, particularly those that would be useful for the younger generation.

Maine Plants

The Woody Plants of Maine. By Fay Hyland and Ferdinand H. Steinmetz. Orono, Maine. 1944. The University Press. 72 pages. Illustrated. $.50.

This bulletin is one of the University of Maine studies and is No. 59 in the Second Series. It is not an identification text but is an annotated catalog of the woody spermatophytes and their occurrence and distribution in Maine.

More power to all the G. I. Joes who brag about the wallopers they caught . . . and the still bigger ones they'll catch in happy days to come. The boys talk a heap of fishing, we're told. Maybe those big Evinrudes that serve with them help sharpen old fishing memories — and appetites!

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Nature in Print

By HOWARD ZAHNISER

THE group of books now at hand by the coincidences of a reviewer include a collection of wildlife fiction with a mountain setting, a biologist's report on a series of studies in marshland, and three small volumes of verses. Yet despite their diversities, they all reflect their authors' esthetic enjoyment of the outdoors. Such an enjoyment is indeed to be expected in verse writers, even in a fiction writer though he deals mostly with predators, and it should not be surprising to know that a biologist has a concern with beauty as well as truth. Still the fact, somehow or other, seems worth noting, so essential is a conscious esthetic enjoyment to any valid comprehensive expression of human attitudes toward wildlife, and pleasingly enough this enjoyment is no less apparent in the biologist's report than in the other volumes now at hand.

H. Albert Hochbaum, the biologist, has had what to him is the great privilege of conducting detailed studies for some time at the Delta Duck Station on Lake Manitoba in the south-central part of the Canadian Province of Manitoba. After studying ornithology at Cornell and game management at Wisconsin, Hochbaum went to the Delta Marsh in 1938 and began the observations and studies that are now reported in *The Canvasback on a Prairie Marsh*, published by the American Wildlife Institute.

The Delta Marsh is some nineteen miles long, as much as five miles wide, and it embraces about 36,000 acres. Hochbaum calls it a wilderness in a land of wheat fields. "The conquests of man," he writes, "have pressed hard upon its borders, but deep within its screen of tules there still exists a solitude as wild and clean and fresh as the peak of an unscaled mountain."

It is apparent at the outset of this volume that the reader has more before him than a mere technical report or interpretation of biological data on the canvasback and other wildlife. Yet as such a report it is of prime importance, as Alexander Wetmore testifies in a foreword. "The pages of this work," Dr. Wetmore declares, "constitute a major contribution of fact and interpretation in this field, and form a foundation for further studies, as well as for better understanding of the measures necessary for preservation of our wild-fowl stocks." Aldo Leopold, Miles D. Pirnie, and William Rowan—who acted as an Advisory Board for the Delta enterprise until 1942—say in the introduction: "This report attempts to describe, in chronological sequence, what the Delta Station has learned since 1938 about the principal events of the duck summers: Arrival, courtship, nesting, brood-season, flightless period, 'vacation-period,' shooting season and departure. In each of these successive periods, the canvasback is used as a 'base-datum,' and the other nine ducks which breed at Delta are compared with it."

These are adequate description from a reviewer's point of view except for their omission of comments on the writer's most excellent style. Not only Hochbaum, but his readers also, have a feeling for the wildfowl and their marshes. This would be true if the book were only a technical report with the author's inspired sketches for illustration, for these drawings with a chaste economy of line and shading would complement the most severe text with the grace of ducks in flight, the charm of birds in repose on the water, and with much of the atmosphere of marshes and skies above them that is picturesque, wondrous, and lonesome. Yet the text, though precise and clear in its descriptions and expositions, is not severe, but on the contrary is alone sufficient to create its own setting.

"The north wind plays sweet music at Delta on an October morning. It pounds a deep bass on the lake shore, roars through the cottonwoods and maples on the ridge, whistles across the cane fields, whines through the tules, and then pours boisterously over the bay where our decoys ride like living birds. Deep in the tules, water chuckles softly against the canoe."

Hochbaum compares marshes and mountains, but his mountain thoughts must surely be much different from those that led Frederic Doyle to write the animal stories in *Smoky Ridge*, and if Doyle were writing of water chuckling against a hunter's canoe he would be creating a much different atmosphere from that of an October north wind playing sweet music. For *Smoky Ridge* might be described as a grim exultation over the continuing triumph over disaster. In a series of ten dramatic realistic tales Doyle creates the tenseness of predation—both for predator and prey—and of living despite lightning in the tree trunk, despite the lumberman's ax, the coal miner's stream pollution, the motorist's machine of destruction on the highway, the trapper's trap. And Theresa Kalab vivifies Doyle's prose with a series of ten forceful lithographs. "There are mysteries of the night in the woodland that will never be explored," writes Doyle in introducing one of his stories. "The faint rustle of leaves, the swish of wings in the dark, a scream of terror or triumph—all echo the fierce determination that some creature shall or shall not die." Doyle's impressions seem strange indeed in comparison with those of a biologist enjoyably studying out ways to increase the numbers of wildfowl for the sport of men, yet Doyle too has an esthetic impulse when he considers the wild creatures of his fiction, for as he writes, "by instinct and reason, and by senses that are not given to us to understand, they have kept their bellies full, reared their families, and have sung their songs for all the world to hear."

"Mountain Moods," it happens, is the title of one of the poems in Gardner L. Green's collection of verse called *The Upward Quest*, but although "crags stern and gray" inspire strength there is little comparison between Smoky Ridge and what Mr. Green sees when he writes, "I need the mountains Whose cold silent peaks Give me the rest that my Weary soul seeks." Mr. Green's other verses are similarly conventional in their moods, his seventy lyrics including a dozen on themes of Nature and a sensitive tribute to Sidney Lanier in a sonnet beginning

> He taught the world to love the lyric sound
> Of Nature's voice in every hurrying stream.

The volume is pleasant reading in troublous times, sharing Mr. Green's enjoyments and appreciating such affirmations as

> The man who loves the land
> Is sensitive to wrong;
> His clean and calloused hand
> Will keep a nation strong.

There are few distinctly Nature verses in Helen T. Douglas Robinson's *Sky Ways*—a book of lyrics inscribed "for those who seek a sense of life that can go through great suffering without losing its great joy"—but one, "Home on the Hill," serenely describes the surroundings of a "quaint old-time garden," another sings

Young Writer

By ALBAN J. DACHAUER

> My fledgling thoughts I brought for your appraise.
> Your chill disdain descended cruelly slow,
> Leaving instead of winged words and warm,
> An empty bird's nest, filled with early snow.

I love old trees that reach on high
Their tender fingers to the sky,

and another "To My Princess" includes the picturesque stanza

I have seen
Straight, strong old pine trees,
Where winds have done their worst,
And it seems to me
To have missed the winds
Would have been to be
Accurst.

Most to be valued of these three books of verses is the posthumous volume *The Bell and the Bugle* by Thomas Tracy Bouve—described as the "life-long . . . verse-reflections of a well-known newspaperman." It is a thoughtful volume of competent verse, including a long lyric called "Nature" describing the poet's excursions to mountain and seaside, yet it probably would merit no special attention were it not for a strikingly beautiful addition it makes to the literature of the nightingale. Though some of its phrases are lacking in freshness, Bouve's "The Nightingale" catches, as few poems have, the magic of the spell that a night-singing bird creates. For one who has never heard the nightingale Bouve quickens a recollection of the mockingbird's song on a moonlight night, and his poem recalls without bitterness of comparison the classic by John Keats. It is a poem of 112 lines written in three parts with varying meters. The first watches "the lingering day go down," the second retells the poignant myth of Procne and Philomela, and then the third starts out—

He who at midnight, when the laborer sleeps,
With the first flowers his woodland vigil keeps
Shall hear as often as God wills a song
To make all other seasons seem too long.

And the poem concludes with these verses that surely express in a rare fashion the esthetic enjoyment that human beings have in Nature:

Now climbs her song the bright celestial stair
In soaring spirals of up-quivering air;
Now like a lark, Heaven-high above the ground
Pours down in soft sweet waterfalls of sound;
Mounts and descends and swells and dies away
A dulcet paean at the shrine of May.

He who has heard this miracle, even as I,
May well be lifted from the dust to cry.
"Lord, what rapt music must Thou not provide
For the bright saints and seraphs at Thy Side,—
What harmonies beyond our hearing,—when
Through this Thy creature, Thou afford-est men
Such heavenly minstrelsy on earth to please
Their senses, and their ills and woes to ease!
If there be singers rarer, more divine
Above, awaiting, than this bird of Thine,
If purer joy lie on a sweeter tongue,
Truly, the promise by herself is sung!"

The Canvasback on a Prairie Marsh. By H. Albert Hochbaum. Washington, D. C.: The American Wildlife Institute. 201 pp., with 18 photographs, frontispiece in color and 31 drawings by the author, 8 figures including map, bibliography, and index. $3.

Smoky Ridge. By Frederic Doyle. New York and Toronto: Longmans, Green and Co. 1944. 128 pp., with 10 lithographs by Theresa Kalab. $2.25.

The Upward Quest. By Gardner L. Green. Boston: Bruce Humphries, Inc. 1943. 80 pp. $2.

Sky Ways. By Helen T. Douglas Robinson. Boston: Bruce Humphries, Inc. 1943. 48 pp. $1.50.

The Bell and The Bugle and Other Poems. By Thomas Tracy Bouve. Boston: Bruce Humphries, Inc. 1943. 119 pp. $2.

North American Wolves

The Wolves of North America. Part 1 (their history, life habits, economic status and control) by Stanley P. Young. Part 2 (classification of wolves) by Edward A. Goldman. Washington, D. C. 1944. The American Wildlife Institute. 636 pages. Illustrated, including color plates by Walter A. Weber. $6.00.

In this very interesting account, which is by far the most extensive and comprehensive work ever brought together, Mr. Young describes the past and present distribution of wolves in North America; their habits, strength, speed, reproduction and family life. The food habits are discussed at length, and, as might be supposed, it is found that any animal that the wolf is able to capture by stealth, strength or speed is utilized. With the settlement of the country, the wolf, of course, found domestic animals more easily subdued than its natural food, and this has proved its doom. The accounts of early settlement in nearly all parts of North America are filled with accounts of the depredations of wolves, and the various means that were utilized to lessen their numbers. Bounties were much in vogue, but the tendency to fraud has always been so great that in many instances the system failed to justify the efforts.

However, by resort to poisoning and trapping, wolves have gradually been reduced in the United States to comparative scarcity, excepting in a few localities. All these, and many other points relating to this wily tribe have been so skillfully gathered that we believe that the book will enjoy the popularity that should be the reward of work well done. E.A.P.

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PUBLISHED BY THE AMERICAN NATURE ASSOCIATION

To Stimulate Public Interest in Every Phase of Nature and the Out-Of-Doors, and Devoted to the Practical Conservation of the Great National Resources of America

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NATURE MAGAZINE is published monthly, October to May, inclusive, bimonthly, June to September, inclusive, by the American Nature Association. Entered as second-class matter May 31, 1927, at the post office at Washington, D. C., U. S. A., and accepted for mailing purposes at the special flat rate of postage provided for in the United States Postal Act of October 3rd, 1917, and February 28th, 1925.

Publication and Editorial Office, 1214 16th Street, N.W., Washington 6, D. C.

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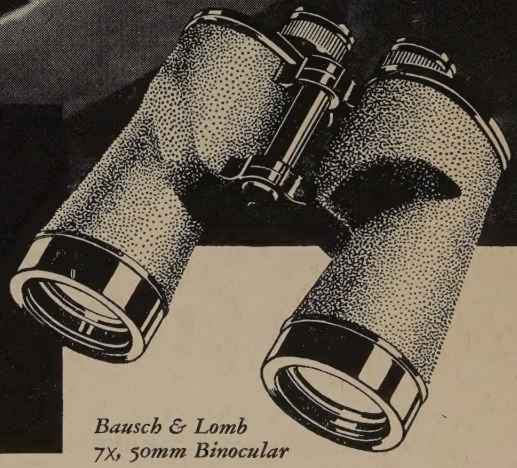

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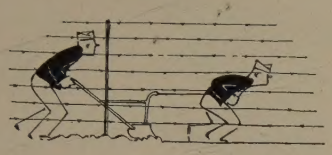
BELL TELEPHONE SYSTEM

Contents Noted

Fifteen thousand pounds of vegetable and flower seeds, including eighteen to twenty kinds, packed in three- to four-pound packages have been sent by the War Food Administration and through the American Red Cross to American boys in German prison camps. This is the first purchase of seed directly for men in these camps, although about one hundred million pounds of vegetable seeds have been supplied allied countries since 1941. Most of the shipments have gone to Russia and England. It is hoped that the seeds for prisoners will enable them to raise Victory Gardens in the camps, although they probably will not openly be so described. And a few petunias and marigolds should help to brighten things up.



An amazing amount of romantic fiddle-faddle has been conjured up to make the hobby of falconry acceptable. It even parades under the banner of conservation by the use of some of the neatest sophistry we have encountered. Actually this so-called sport has been costly in the lives of much-persecuted hawks, and threatens to wipe out the duck hawk, the peregrine of the falconer. It also causes the death of many protected song and insectivorous birds. And the technical methods of the falconer are something that the humane societies should get aroused about, but do not. Having now offended all the falconers, and probably some of the S.P.C.A. folks, we will heartily recommend a bulletin entitled "The Duck Hawk and the Falconers," recently to hand from the Emergency Conservation Committee, 767 Lexington Avenue, New York 21, N. Y., and available free on request. We hope that it is widely read.

Ronald Farley is 16 and his sister Doris is 14. They live on a 95-acre farm in Ohio. When their father was taken to the hospital last fall he left them with 24 hogs about ready for market, nine cows to be milked, 44 hogs in the fattening pens to feed and water, 150 laying hens and 500 pullets, and the products of the Victory Garden to can. Ronald got up early enough in the morning to do all the feeding, milking and other farm chores. Doris cared for the chickens and put up a hundred quarts of tomatoes, among other things. And neither one of them missed a day of school. We are looking for the fellow we heard arguing with the waitress because he could not have a second square of butter. It might do him good to hear about Ronald and Doris. Or would it?

"Rest cures are not effected by the contemplation of a row of ugly billboards," said Justice Bliss of the Appellate Division of the Supreme Court of New York State, affirming a verdict holding the Sterling Fox Farm guilty of violating the law in maintaining billboards in the Adirondack Park. Rest cures, the judge said, "may be brought about, however, by a sojourn in unspoiled natural surroundings. Surely the State has the right to preserve these natural conditions as a rest center for those who need them." Thus the Court struck a blow against the inexcusable invasions of the ubiquitous billboard, and another in recognition of the healing of the natural wilderness.

We are taken to task by one reader for publishing, in the picture story of the malaria mosquito in our May issue, one picture that he interprets as "open advocacy of pond, marsh and swamp drainage." In so doing, he says, we are inconsistent when we "rant and rave" about the wildfowl shooting laws. We have long contended that the mosquito control people and health authorities are taking the easiest and wastefully drastic course in their drainage programs. We believe that they have virtually ignored biological control and thus have been grossly delinquent in these respects. But we do not feel that we openly advocated the drainage method merely by publishing a factual story in pictures of what the control policies are. We have published fact articles about the part natural resources play in the war but this does not mean that we openly advocate war. As for ranting and raving—well, we are for the birds first, and plenty of them, and when we are convinced that no species is in danger we will shut up—but not before.

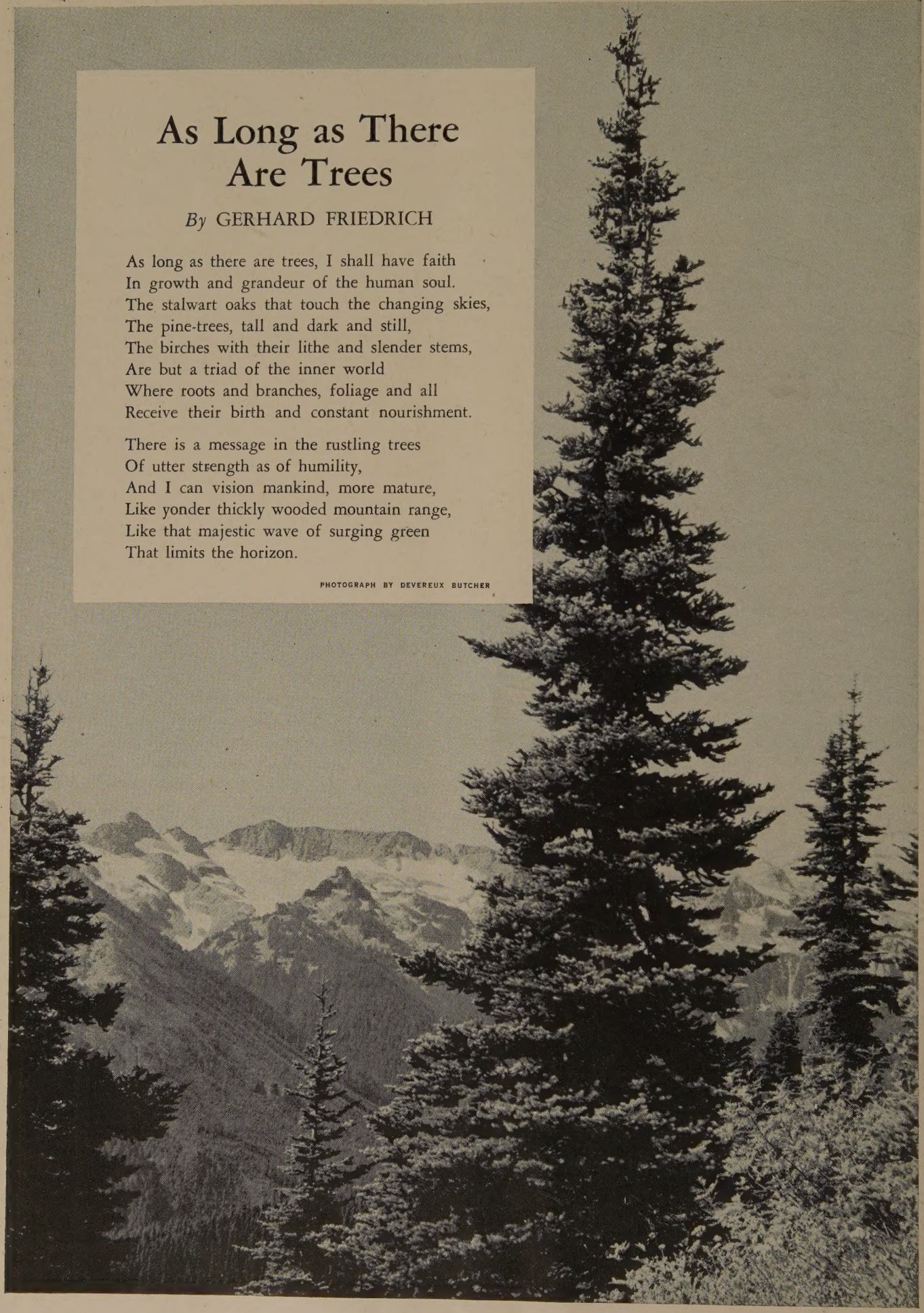
Every public school building in Wilmington, Delaware, which is fortunate in having a fine Department of Nature Study under the direction of Miss Violet L. Findlay, has bound volumes of *Nature Magazine* from the very first issue. It is such realization of the permanent value of his work that makes this editor's life a happy one, and gives him satisfaction of a most particular sort. R.W.W.

As Long as There Are Trees

By GERHARD FRIEDRICH

As long as there are trees, I shall have faith
In growth and grandeur of the human soul.
The stalwart oaks that touch the changing skies,
The pine-trees, tall and dark and still,
The birches with their lithe and slender stems,
Are but a triad of the inner world
Where roots and branches, foliage and all
Receive their birth and constant nourishment.

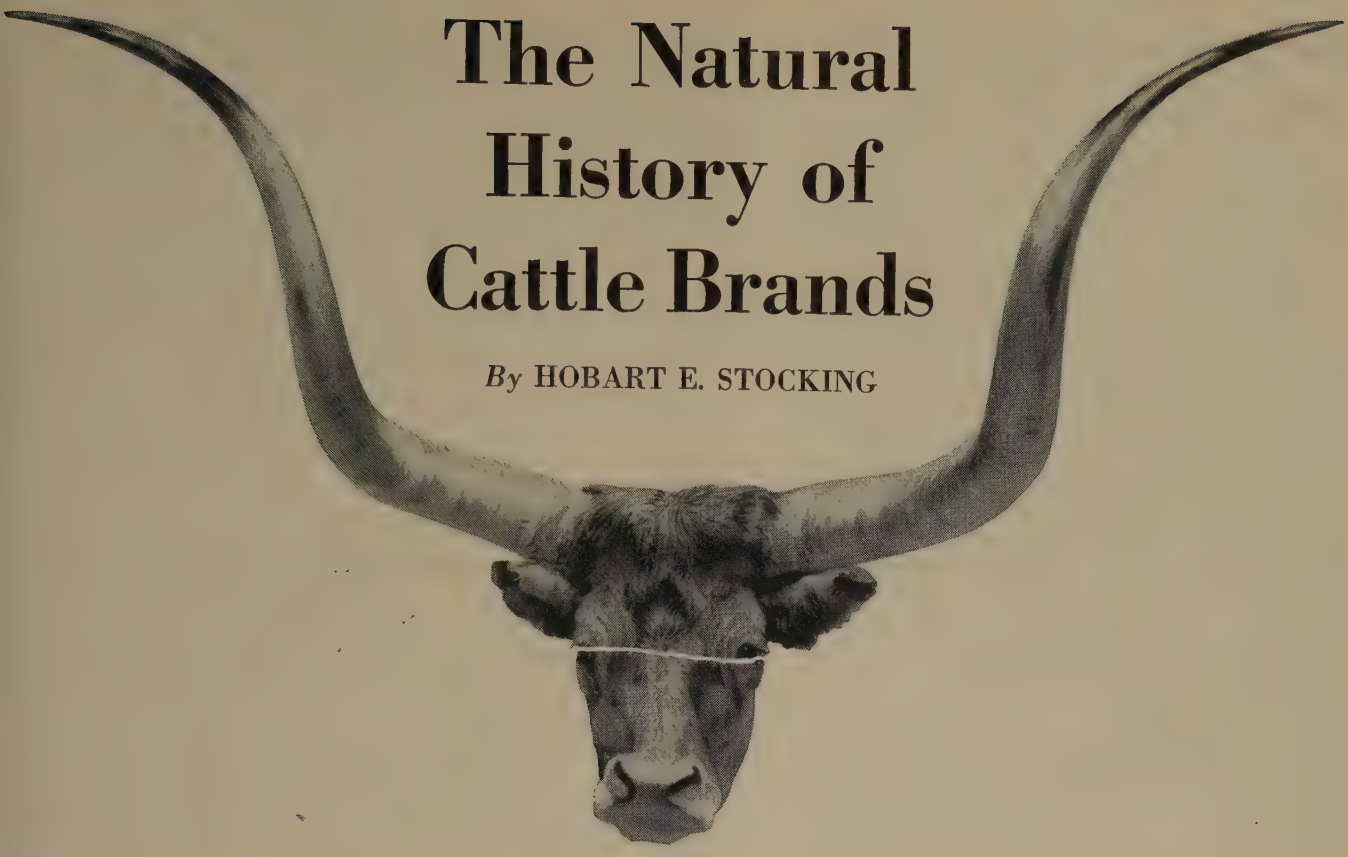
There is a message in the rustling trees
Of utter strength as of humility,
And I can vision mankind, more mature,
Like yonder thickly wooded mountain range,
Like that majestic wave of surging green
That limits the horizon.



PHOTOGRAPH BY DEVEREUX BUTCHER

The Natural History of Cattle Brands

By HOBART E. STOCKING



BACK when practically every man west of the Mississippi had a cow, he needed an indelible mark of ownership. Then, as now, cows looked much alike, and no man hesitated to claim beef not positively identified as the property of another.

When the range was open, and limits of a ranch were defined by claims rather than fences, he needed a large brand. Longhorn cattle were built like deer but they could run like antelopes. They required a brand that could be read at first sight, for frequently there was no second chance. With a hot running-iron rancher Joe Doakes began writing up forward on the left shoulder, and burned JOEDOAKES just as far aft as the foot-high lettering required. It was rough treatment but it was not lethal.

Anyone could read Doakes' brand as far as he could see a cow, and that convenience saved considerable riding. With no fences to hold them, checked only by line-riders who daily rode the claimed boundaries of the ranch, cattle drifted with winter winds. Doakes' brand removed all doubt of ownership no matter how far they drifted.

Longhorns were hardy animals. Turned loose with a smoking brand inscribed from shoulder to hip, a lean steer picked up five pounds weight as he legged it for a favorite mesquite thicket or canyon. By the time barbed wire cut the range into pea-patches, Joe Doakes—Old Joe now—had been raising blooded bulls for a decade. Their offspring were not so hardy under the shock of a large brand. Besides, they were too broad across the brisket that they could not run off a dime before an alert cow hunter had read their horoscope. Eventually the amount of unburned hide became a larger factor in price of beef on the hoof—the need for a large brand had passed. Old Joe moved with the times, hung a J on the front of a D and read his brand "J D Connected."

At all times Joe, Young or Old, had tolerable pride in his brand. To him and his agents it meant sound beef with a minimum of scrub stock. Also, it meant a lot of things he had earned by hard work. It was stamped on his custom-made saddle; very likely it was a design on his hand-tailored boots. The main gate, the only plank gate on the ranch, bore a rough version painted by a rough hand. If Old Joe's daughters asked frequently enough, he would part with money for stationery with the brand at the top of each page. Doakes calculated that this was sufficient address for any recipient with cow sense, and no daughter of his would be writing to anyone without. And it was, too, —a letter mailed in New York City, addressed simply "1 0 1 Ranch," got to the right party out in Oklahoma.

Doakes liked to see his brand in as many places as it was legal. He had a standing order with the nearest newspaper to run a cut showing his brands and earmarks in every issue. This entry was not only pleasing to Joe's eye, it was also good range sense. It stated in unmistakable simplicity that all stock so marked belonged to Doakes. It told the rancher three or four counties away just where those "J D" steers belonged, and eventually the strays were drifted

homeward. When Doakes sold a thousand head of three-year-old stock he searched the newspapers for the names and addresses of the owners of the strays for which he had given a bill of sale. Eventually the right parties were paid for cattle they had never missed.

Two or three generations ago there were hundreds of Joe Doakes, Doakes Brothers, Doakes Land and Cattle Companies, and each ran from one to a dozen brands. Every mark was certified by state or county records, and the law said that anything on four legs bearing "J D Connected" belonged to the Doakes outfit. If there was a John Doe who independently conjured up "J D Connected," and burned it on a steer in the state or county in which Joe's brand was registered, that steer belonged to Joe, too.

Whatever a man's brand might be, it was one of his own design and it marked his property. If he had yet another reason for boasting he worked that into his brand somehow. A cowboy, only slightly less shy than his long horned stock, gathered enough courage to propose in 1870, and memorialized the year of his marriage by marking his herd and their offspring with a neat 70. Mr. A. E. Adamcik hitched a 7 on one leg of an A, a D onto the other and "7 A D Connected" told all concerned that there were seven heirs to the increase of his herd. J. C. Studer was a blacksmith, and when he turned cowman his stock were marked with an "Anvil." The Reverend R. O. Watkins branded with a simple 3 and trusted that the Holy Trinity would look with favor on his labors. An immigrant from Essex County, England, settled in Texas and appointed every cow on his ranch a walking delegate of the Old Country by branding with SX.

When there were no fences livestock would wander. Even after the range was fenced there never was a bull that let barbed wire interfere with his courting, so cattle kept up the habit of drifting. On every ranch there was beef belonging to adjacent outfits and it was common sense for several owners to share the work of roundups.

When branding began there were three or four fires on the flat, and in each lay the business end of all branding irons of the participating outfits, a complete set in each fire. A roper mounted on a cutting horse rode as quietly as possible into the herd, set his horse on a calf and noted the brand on the cow it followed. The horse took over from there, and, without guidance from the rider, and in spite of twists and turns of the calf, cut it from the herd. A good cutting horse knew its business, and the best never had a bit in its mouth throughout a lifetime.

Once out of the herd the rider flipped a loop to snag the calf by head or heels, whichever was convenient. In either case the animal was flattened when it hit the end of the rope for the other end was tied fast to the saddlehorn. Each youngster received the brand that marked its maternal parent, and as the horse dragged the calf to the fire the rider sang out to waiting men: "Bar H," or "Running W," or "Flowering Lucy," or "Ann," or whatever brand he had seen on the cow.

The bawling animal got the works. With a sharp knife someone cut, slashed, notched or cropped its ears according to the proper pattern. In a crowded herd, earmarks were easier to see than brands, and every rancher had a distinctive type of earmark to accompany his brand.

Finally, on the left shoulder, ribs or hip was burned whatever brand the roper had called out when he brought the calf to the fire. Then it was hustled off to a growing herd that bore that brand, and later its mother was cut from the main herd and sent to join her calf. Eventually the separated and branded stock were driven back to the home ranch.

The cowboy who roped the calf read brands from left to right, from top to bottom and from outside inward. If a fancy figure defied translation he gave it a name then and there. He read "H B" on a cow just as you have read it. Brands reading downward were as common as any and the mark might have been an H over a B. The rider would shout "H over B," or more likely "Hell over Breakfast," but in either case the man at the fire would know which iron to draw out. Outside-inward-reading brands were frequent, and for an O in a square he would have called "Box O" and for a figure one in a diamond, "Diamond One."

It was the hope of every stockman that his mark would be difficult to alter without the change being obvious. This hope was the basis for intricate and complicated brands. Simple brands were a cattle rustler's delight. John Chisum, a notable contemporary of the outlaw, Billy the Kid, branded thousands of cattle with a single bar or "rail" that ran from shoulder to hip. It was a simple brand and it had distinction, for, in thin, clear New Mexican air, it could be read half-way across a county. Unfortunately it could be easily changed. Rustlers drove off Chisum stock,

burned a knot on the rail and sold them as "Bug on a Rail" steers.

An enterprising rustler could freshen up almost any old mark just the right amount by putting a wet blanket over it and rerunning the brand through that. Alterations and additions he made thereafter would look the same age to everyone outside the steer. A determined rancher could kill and skin a doubtful animal, and by careful examination of the inside of the hide learn what part of a brand scar was new and what was old. It was an operation performed safely only in seclusion, for no man, rustler or not, could peacefully bear such an extended reflection on his honor.

There was a time in Texas when a man's poverty was accurately measured by his annual cow-tally, for, although cows could mostly look after themselves, it did cost something to keep up a ranch house around which they could loaf. In those times Texans were frank enough to admit that they had more cows than cents and they did everything possible to reverse the situation. In the 1830's New Orleans was an outlet for beef until steamship companies strangled shipments from that port to the West Indies with fatally high freight rates. During the Civil War, until Yankees made the Mississippi River a greater hazard for drovers than it was for their swimming herds, Vicksburg and Natchez were trail ends. In the years after the Civil War, Abilene and Dodge City, Kansas, saw hundreds of thousands of longhorns loaded on railroad cars. Later on, new ranges in Colorado, Wyoming, the Dakotas and Montana took hundreds of herds to fatten for market on northern grass.

Colonel Goodnight, Oliver Loving, Ab Blocker, and scores of other drovers trailed herds northward. They gathered their trail stock from as far south as the Texas Gulf Coast, and a herd of 3000 frequently carried more than a hundred different brands. The journey was long and the hazards many. A simple "road" brand was needed to identify stock that might stampede a dozen times between the Brazos River in Texas and the Arkansas River in the north. The simpler the road brand the better, for it had to be stamped on three thousand hides holding prime beef, a job that wore out he-men and horsepower. Prime beef in those days ranged from five to twenty years in age, and a five-year-old longhorn was likely to be a rugged individualist that objected to fancy engraving on his hide.

Goodnight and Loving road-branded with a simple O. Another drover burned a hook above the diverse marks on his trail herd. The Blocker outfit used a reversed seven and the "Blocker Seven" was known from Texas to Montana.

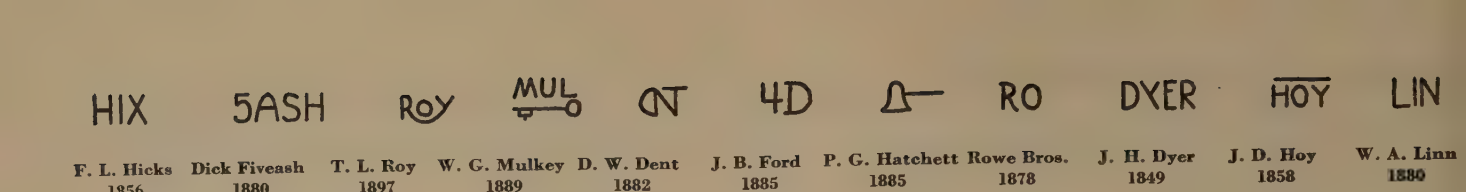
Road brands could be simple, for the stock that bore them were closely guarded as they were pushed north. Ranch brands had to be more complicated and less susceptible to alteration, because they identified cattle that the owner would not see more than once a year—a period in which rustlers might put in considerable part-time work doctoring brands.

One stockman who put his trust in the wrong man registered a bar over MD for his brand and insisted that it should be read "Bar Money Down." To a stranger the mark would be less descriptive but recognizable as "Bar MD." The rancher who stamped his herd with 22 was bowing before the rising tide of civilization, for he had just acquired the twenty-second telephone in a Texas county about the size of Rhode Island. Another stockman who held a low opinion of the state of civilization around his range branded with a 4 hammered onto the shank of a 5 and announced that his "Forty-Five" mark was an open threat to rustlers.

Higher education sometimes strayed out to the range and designed a three-pronged, curved gadget, which to the owner was a "Fleur de lis." He was a man alone with his fancy. To all his hands and to every other rancher it was "Flowering Lucy." However, the boys who handled the rope were not completely impervious to learning and the finer things in life. When a grizzled cowhand was called on to name a mark that consisted of a curve over a diamond with two legs he drawled, "Well, I never seen a brand I couldn't name. That's nothing but the 'Fleur de Mustard.'" From then on it was, although the owner persisted in calling it "Flying Quarter Circle Diamond and a Half," which is what it actually was, by all rules of brand reading.

One man might have a brand born of sentiment, but another might use his to express contempt. The owner of the "Wineglass H" branded with an upright glass resting on an H on its side. When Frio County, Texas, was voted dry in 1896 he expressed his opinion of the trend of the times and made it an empty wineglass by turning the brand upside down.

With as many ranches as there were, and with each running more than one mark, it was not surprising that the combined inge-



F. L. Hicks 1856 · Dick Fiveash 1880 · T. L. Roy 1897 · W. G. Mulkey 1889 · D. W. Dent 1882 · J. B. Ford 1885 · P. G. Hatchett 1885 · Rowe Bros. 1878 · J. H. Dyer 1849 · J. D. Hoy 1858 · W. A. Linn 1880

"Seventy-Six" 1856

"Ox Yoke" 1886

"Pigpen" 1885

"Pitchfork" 1901

"Muleshoe" 1860

"Bow and Arrow" 1845

"Trunkhandle" 1838

"Crowfoot" 1856

"Spade" 1889

"Media Luna" 1883

"Old Iron" 1668

"Laurel Leaf" 1868

"Roman Cross" 1894

"Hog Eye" 1908

"Rafter O" 1908

"Cinch Buckle" 1830

"H Crook" 1886

"Double Diamond" 1877

"Spectacle G" 1887

"Square and Compass" 1880

nuity of the thousands in the cattle business devised brands that walk, run, box, drag, hang, swing, fly and tumble; some that are lazy and some that are plain crazy.

A simple A brand needs only flanges at the bottom in order to walk. Local custom, if not topography, determined the type of feet. An angular foot converted a "Figure Seven" brand to a "Drag Seven." Mr. Carhart, an oldtimer in the Texas Panhandle, registered an arc of a circle over a heart as his brand and the ranch was known as the "Quarter-Circle Heart." A quarter-circle connected to the top of a letter set it to swinging or hanging, like the "Hanging H." The same design at the bottom of a letter set it to rocking, like the "Rocking A" and "Rocking R." There was, as you have already guessed, a "Rocking Chair" ranch and its mark on cowhide was a silhouette of an armless rocking chair. A short bar before and after a letter, either separated from or connected to it, gave it wings. The mark —U— should be familiar to those who recall Chip of the "Flying U."

The rancher who wanted distinction in a simple letter could have it by stretching the letter out so that it "ran." The largest ranch in Texas, the King Ranch on the Gulf Coast, owns the "Running W" brand in that region, but their mark is known as the "Little Snake" to the Mexican vaqueros who work on the ranch.

One ingenious rancher joined distinction and sentiment by combining an A with a running N to get "Ann," which was his wife's name. Some letters that could not run could be boxed, like the "Boxed H," an H with the uprights extended into squares. Rounded letters that could neither run nor box could be mashed, and to a man on a horse, who views the world at a slightly different angle from that of pedestrians, a "Mashed O" was invariably a "Goose Egg" brand.

Without a doubt there are more Bar-B-Q's in the East today than there ever were in the West. Very probably they are all lineal descendants of Colonel "Barbeque" Campbell who took his name from his brand—a bar over BQ. In addition to this legacy for the East, Colonel Campbell endowed folklore in the Southwest. When the State of Texas reached a point of maturity at which the dignity of its legislators demanded an imposing capitol building, the treasurer pointed out that they had more pride than money. They had, however, plenty of land because when the Republic of Texas annexed the Union it reserved all open lands for the use of the state. Texas made a deal with a Chicago firm to take payment in acres for a capitol second to none. The financing company found itself in the land business and organized the Capitol Land Syndicate to run cattle on its three million acres scattered over ten counties in Texas. "Barbeque" Campbell was their first foreman, and, with the aid of Ab Blocker, another famous cowman, he designed a brand for the new outfit. Logically (Continued on page 386)

"Old Woman" 1868

"Scribe M" 1870

"Cross Tie" 1870

"Scissors" 1880

"Crosby" 1883

"Buckhorn" 1895

"Capital B" 1839

"Currycomb" 1875

"Forty-four" 1902

"Turkey-track" 1900

"J A" 1876

"Cow" 1867

"Mill Irons" 1870

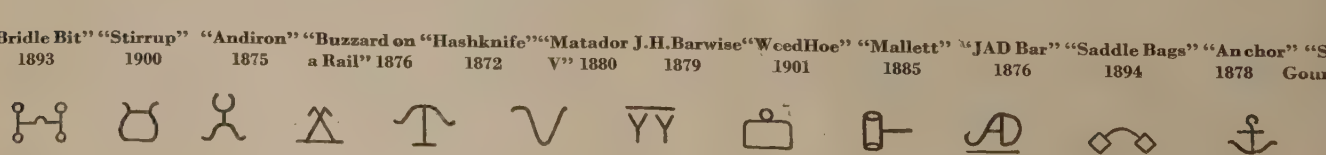
"Fishtail" 1912

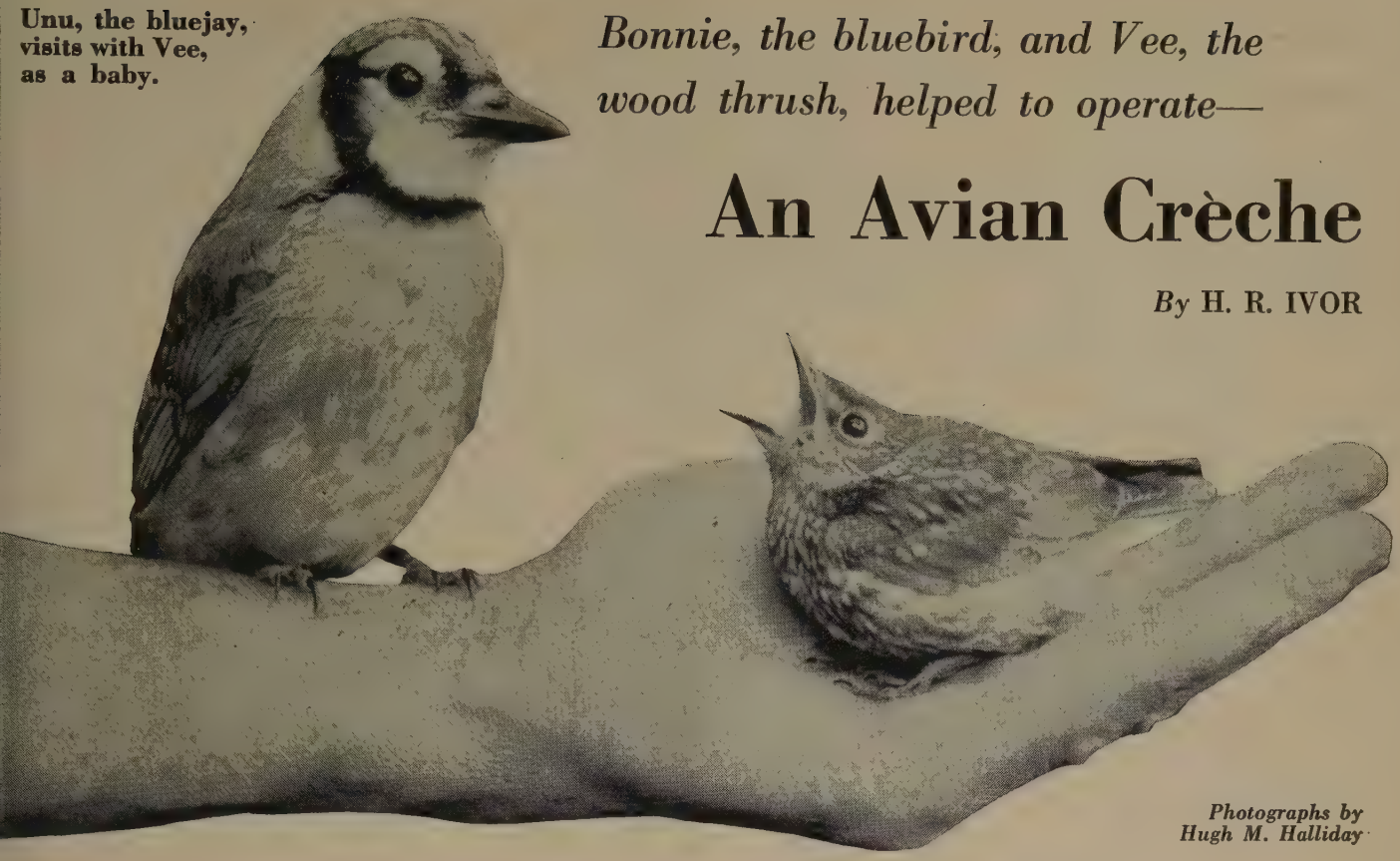
"Nine H Six" 1845

"Lizard" 1857

"Swastica" 1908

"Bridle Bit" 1893 · "Stirrup" 1900 · "Andiron" 1875 · "Buzzard on a Rail" 1876 · "Hashknife" 1872 · "Matador V" 1880 · J.H.Barwise 1879 · "WeedHoe" 1901 · "Mallett" 1885 · "JAD Bar" 1876 · "Saddle Bags" 1894 · "Anchor" 1878 · "Spanish Gourd" 18





Unu, the bluejay, visits with Vee, as a baby.

Bonnie, the bluebird, and Vee, the wood thrush, helped to operate—

An Avian Crèche

By H. R. IVOR

Photographs by Hugh M. Halliday

UNTIL you have served as foster parent to eighteen nestling birds at once you have never really been busy. Fourteen feathered parents should have been trying to quiet the quivering wings and satisfy the coaxing calls of this troop. They would have had to work from dawn to dark to do this. So did I.

Why, one might inquire, take over such a task? The answer is—in the interests of science. There is much that is not known about the intimate life histories of our birds. As Dr. Lee Crandall has pointed out, the bird in the wild does not show its true personality. "This personality," he says, "we usually get from a hand-reared bird because it acts toward one who rears it as it would toward its own family. In no other way can one get on a bird's own level."

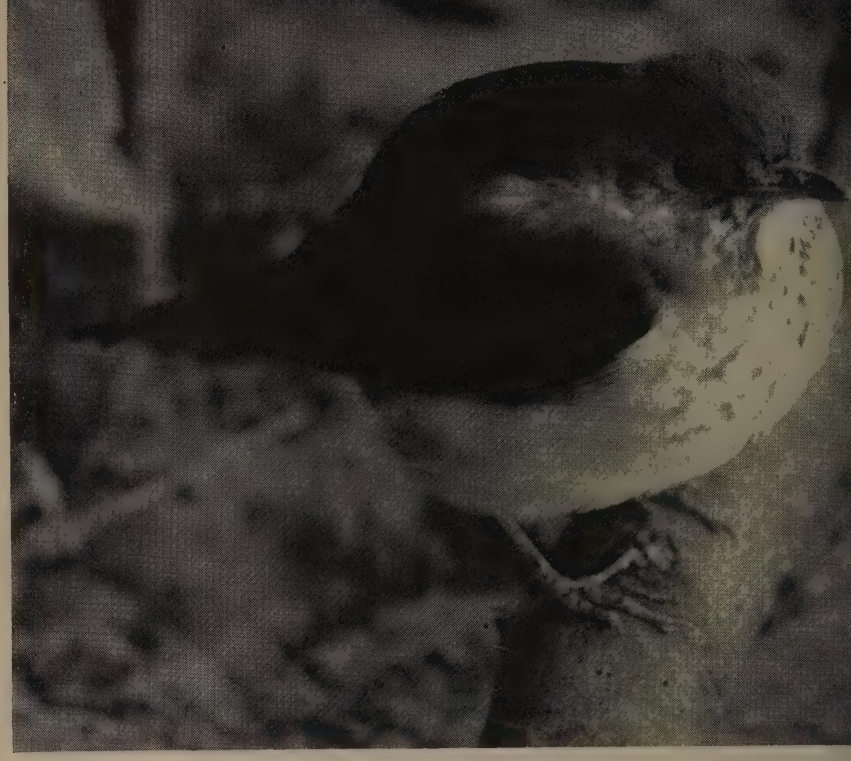
To get on this avian "level," and to try to fill in gaps in our bird knowledge, I maintain an aviary not far from Toronto, Canada. There is a summer aviary, and a winter one. There birds are kept in a state of semi-captivity, while in the woods and undergrowth all about, and in nesting boxes, birds rear their families in a free sanctuary. Each year a few nestlings are reared by hand for study, and with the hope of obtaining information that will help us better to protect and increase our bird population.

Thus I acquired the hungry group. The first was an eight-day-old bluebird, adopted before the middle of May. About mid-June the nursery was taxed by the addition of three bluejays, three bobolinks, three cardinals, two Baltimore orioles, one cowbird, three wood thrushes and three veeries. None were more than ten days old, and fear of man was barely dawning in them.

Usually no more than three or four nestlings are hand-reared at one time because the first—and, often, the second—nests of many birds are robbed by natural enemies. This year, however, there seemed to be a scarcity of predators, and most birds in the sanctuary succeeded with their first nests. Thus the population of the nursery was larger and more varied than ever before.

Feeding is done with a partly hollowed elderberry cane that is dipped into prepared jars of feed. This feeding stick still brought coaxings from the baby bluebird after six weeks in the winter aviary, which she shared with an old, unmated wood thrush and a pair of bluebirds until the eighteen nestlings moved in. Other birds had been moved to the summer aviary.

By this time the little bluebird had acquired a name—Bonnie. She was a lovable bird and indeed bonnie, so the name fitted. When the new nestlings arrived and began setting up a chorus of appealing infant bird calls, stretching wide their exquisitely colored mouths—some lined with orange, some with pink—Bonnie took an immediate interest. She watched me curiously, flying to my hand expectantly when she saw the food-stick dipped. Yet when its contents were given to another she did not seem disappointed. Indeed, after this had happened several times, and the stick was finally offered to her, she took the contents, turned to the bird mite next to her



A Wilson's thrush, or veery, at the Ivor aviary. At first Vee, the wood thrush, refused to feed the baby veeries that were being reared by hand.

and popped the food into the waiting mouth.

With this Bonnie became my assistant. She would take the food and hop to first one nestling and then another, none of which was a bluebird. No baby received more than two helpings, either, and if only one was near and had had a second serving, Bonnie would hunt up one that had not been fed. She played no favorites, rarely forgetting one, and soon taking the food from the jars instead of the stick.

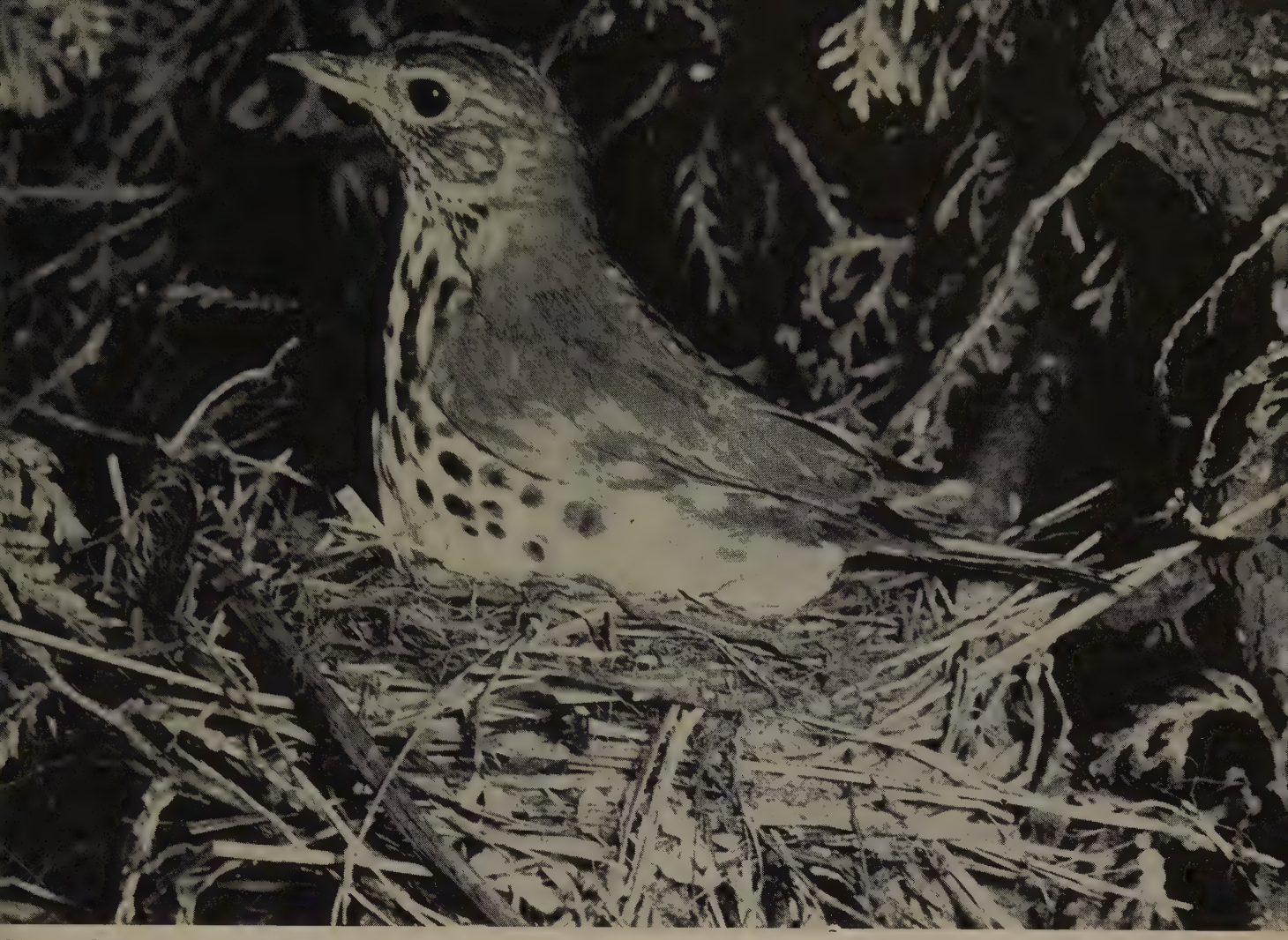
Bonnie was a great help, and on the second day as foster parent I found another aide. The call notes of the three baby wood thrushes attracted the attention of the old wood thrush still in the aviary. Her head cocked on one side, she listened. She made a little run toward one of the babies, seeming partly puzzled, partly fearful. She would stop and run toward the food dish, then approach the youngsters again. With each approach the desire to feed them grew. Then she would dash back to the food dish for repeated dabs, until her bill was full; then to the little thrushes. She stood over them uncertainly, for they would not recognize her as a parent and would not open their bills. In two days twelve-day-old baby wood thrushes had forgotten their kind! Yet memory would return and Vee, as we named her, knew her kind, refusing to feed the baby veery thrushes, who, curiously enough, opened their bills when she was near.

Bobo, one of the young bobolinks that Bonnie and Vee helped raise.

Vee, however, had made up her mind to feed those thrush babies. She would follow them around, beak crammed with food. She would gently peck a youngster and utter a low call note. Failing to interest one stubborn little bird, Vee would try another and then the third, losing some of the food en route and going back to the food dish for more. Once while she was coaxing a nestling I offered it food. The orange-yellow mouth popped open and before I could fill it Vee popped her billful in. That seemed to break the ice and her persistence was rewarded.

However, the little thrushes usually seemed reluctant to take the food from her. Impatiently she would peck them on the head, unintentionally hurting them. So they were placed in the enclosed porch off the aviary, and, since most of the other nestlings had taken to roosting in places where I could not reach them with the food stick, all the others except the bluejays were transferred there, also. Shrubbery there provided exercise, and Bonnie Bluebird went along to help with the feeding. Moving around or through this porch became something requiring care, for one never knew when a baby bird would dart under one's feet.

Meanwhile, Vee was still in the aviary and kept flying to the wire with food in her bill to feed the little thrushes. The second day I let her in and she went immediately to work. For some reason we shall never know she no longer concentrated on the nest-



Vee on her own nest caring for her own brood some time after she had proved such a fine foster parent for the varied group of young birds that had been taken into the Ivor aviary to be reared and studied.

lings of her kind. She began to feed all fifteen, showing no favoritism. And now, too, the thrushes accepted her offerings without hesitation.

Vee was untiring. Running to a feed jar she would fill her bill, a dab at a time. Then off to thrush or bobolink or cardinal. Part of a beakful would pop into one waiting mouth, part into another, until the beak was empty. Then she ran back for more. She never seemed to stop to eat, herself. She never inserted her beak gently into the mouths of the youngsters. It went in with a sudden, incisive motion. This worked well with thrushes or cardinals, with their great, gaping mouths. But bobolinks and orioles had been designed for different treatment. The mother oriole on mess duty inserts her long, needle-like bill into the throat of her young, and the bobolink is a gentle feeder. Such niceties were no concern to Vee. She did not know these tricks—and probably would not have cared—but was intent only on seeing that the whole group was well fed.

The bobolinks were a particular challenge to my assistant. They always weave their heads back and forth when food is offered. It seemed that, when the food stick was poised to pop a mouthful in, that mouth was suddenly elsewhere. However, Vee seemed to sense where the mouth was going to be and snapped the food in. Bonnie had no trouble, either, although she was much more gentle about it.

Of course, I helped these two foster mothers. It was too big a task for only two of them. Yet Vee and Bonnie took their responsibilities differently. To Vee it was serious business, an insistent urge to carry through a pre-ordained duty. She was on the go all day. If I were careless and let a food jar become empty, she would run to me and look up at me reprovingly. To Bonnie it was fun. She would rest often, although she was no slacker.

Vee's rough and jerky feeding methods with the nestling orioles was finally too much for them. After a few days they refused her offerings, and she seemed to have hurt their throats. So I took them away and carefully fed them by hand, finishing rearing them myself. Vee and Bonnie continued with the others. When the babies were nearly a month old they seemed to notice where the food was coming from. They began to peck, and then began to feed themselves.

Vee could now rest from her labors, feeding the young less and less, although they continued to coax. By now the delightful "pnk, pnk" call of the adult bobolink came from the throat of the oldest of this trio. The oldest wood (Continued on Page 386)

The female flower of an oak is protected by a glassine bag securely tied at the opening and with cotton around the twig to inhibit slipping and insects. Then selected male pollen is introduced through the bag by medicine dropper. A second glassine bag is added and both are covered with a kraft bag.

Producing hybrids with special qualities holds promise of—

New Trees for Our Forests

By DOROTHY PARKER ROWE

Photographs courtesy of the U. S. Forest Service

FORESTERS tell us we are cutting our trees faster than they grow. For example, many of the giant spruce trees leaving their forest home for airplane factories these days are fully 400 years old; and most of them are at least 200 years of age. That is a lot of growing time! At the present rate of lumber production, the supply of forest trees is constantly diminishing. What, therefore, is the answer?

Tree breeders believe one answer may be hybrid trees. (Yes, there are tree breeders, the same as animal breeders and plant breeders.) These tree scientists are beginning to roll up their sleeves. "You're doing a grand job of it," they are saying to Nature, "but Uncle Sam is using even more wood in this war than steel. We've got to grow trees faster."

Scientists claim that forest trees can be improved by hybridization, or cross-breeding, as agricultural and horticultural crops are improved. Hybrid corn, they point out, is a by-word with farmers, and Luther Burbank's fast-growing cross between the California black walnut and the eastern black walnut is equally well known.

A tree breeder who has made a reputation for developing fast-growing hardwoods is Dr. Ernst J. Schreiner of the U. S. Forest Service. Actually, he calls himself a geneticist, because he investigates heredity and variation so as to know why individual trees resemble their parents or differ from them, and he determines how new strains can be developed. When he talks about his life work, he fairly bubbles over with optimism. He says that although the tree breeder has hardly scratched the surface, infinite possibilities lie ahead. As the tree wizard describes new hybrids he has created, the listener's imagination runs rampant, visualizing the magic hybridization can conjure with trees.

This sandy-haired scientist, although of youthful appearance, has had years and years of experience breeding trees. Twenty years ago when Dr. Schreiner began work, under the direction of Dr. A. B. Stout of the New York Botanical Garden, on a cooperative poplar breeding project financed by the Oxford Paper Company, no other large-scale program with the improvement of forest trees as its primary objective was under way in the United States, or, for that matter, anywhere in the world.

Dr. Schreiner became associated with the Forest Service in 1936, and ever since then he has been hybridizing poplars, birches, ash, maples, oaks, and other forest trees in the Northeast. Coincidentally, that same year the Oxford Paper Company turned over its hybrid stock and records to the Forest Service so that the new hybrid poplars could be tested further to find their place in our forest economy.

Now carefully protected against any unwanted pollen, the branch is labelled with the details of the pollination and the pedigree of the male and female pollens. In the greenhouse are bundles of hybrid poplar cuttings bearing female catkins, and, at the right, other bundles, pollinated, bagged and tagged.

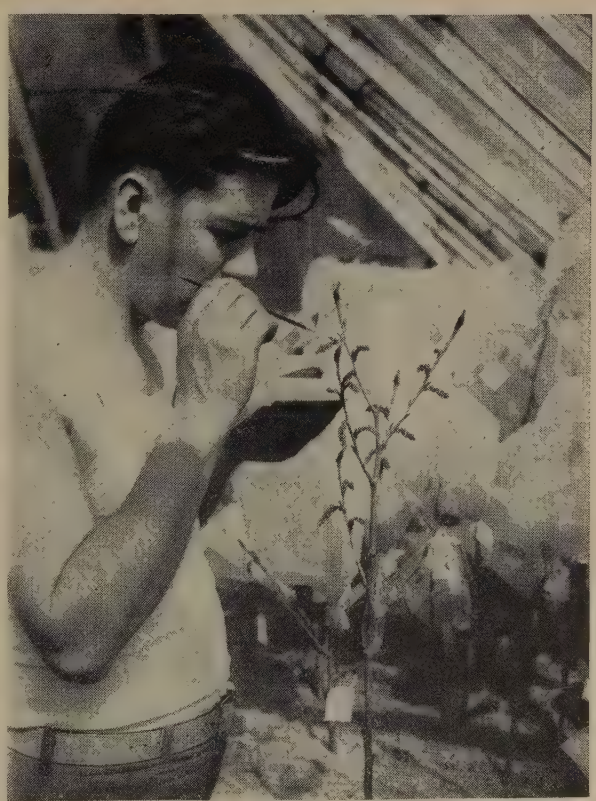
"The business of breeding forest trees is no picnic," Dr. Schreiner says, "what with the tree breeder having to double as aerial acrobat." If you picture the tree breeder as a staid somebody, safely transferring pollen from one flower to another within easy reach of the ground, you are definitely wrong—except that forest trees *do* have flowers. But try and get to them. All too often they are on the outside branches at the very top of the tree.

"Working with petunias or violets," Dr. Schreiner explained, "involves little physical effort; working with trees is a different story. Most people don't even realize trees have flowers, because, in most instances, the flowers are inconspicuous."

Sometimes, if the breeder is lucky, he can work the flowers from an ordinary stepladder. Then again, he has to use sectional stepladders that take him up thirty feet. When the flowers are beyond the reach of sectional ladders that can be carried readily, the resourceful tree breeder gets a bigger and heavier ladder, which he sets up on a truck. But many of the best "parent type" trees are unusually tall, and when the tree breeder runs out of ladders it is up to him to "play monkey" and climb the tree in order to carry on his work.

The technique for *controlled* breeding of forest trees is similar to that for breeding agricultural and horticultural plants. Above all, it is essential to protect the unopened flowers from chance pollination, both before and after the desired pollination is made. Glassine and kraft paper bags turn the trick.

If you are interested in the procedure of tree breeding, come around in the spring of the year. About two weeks before the female flowers of the tree you are going to pollinate have opened, you are perched on a ladder in a treetop, placing a glassine bag over a branch where the flower buds are visible. You must be sure to tie the bag securely over a bit of cotton wrapped around the stem. Next, tie a stout kraft paper bag over the glassine bag for added protection. Later, you have to make at least two or three more trips to the forest in order to catch the flowers in exactly the right condition for pollination.



Pollen being applied to female catkins on hybrid poplar branches. Poplar is one of the few forest trees that can be "bred" in the greenhouse because the seed ripens on cut branches in a few weeks.

Once again you are balancing yourself on the ladder. This time you note that the female flowers are receptive and you are ready to dust pollen—which you have laboriously collected from male flowers

Pollinating the trees calls for some acrobatics on the part of the hybridizer, who must reach the flowers from tall ladders set up on trucks.

These poplars are hybrids that attained a height of twenty feet four years after they had been planted. They were bred on a special project.

of another tree—on the flowers of the female parent you have selected. The pollen is handled in small vials stored in air-tight containers along with chemicals to maintain proper moisture conditions, and you do the dusting with a finely-pointed medicine dropper.

First, you puncture the glassine bag with the medicine dropper containing the pollen, and, after shooting in the pollen, you must tie another glassine bag, as well as a kraft bag, around the flowering branch for protection until the flower is past bloom. Before the seeds have ripened you will have to cover them with a cloth bag so none will be lost. After the seeds have ripened, they have to be collected —which means still another game of hide and seek in the treetop.

It may sound easy, if you go in for gymnastics. But oh! those aching arches jammed against the ladder rung; not to mention the mental strain of the novice, wondering whether his safety belt will hold! Probably you decide to experiment with violets after all.

It takes a long time to "fix" a new plant so that it will "come true to seed," and the forest tree breeder tries to utilize a short cut that is possible with trees that can be propagated *vegetatively*—from cuttings.

If the young stems of a poplar are cut in short lengths and the pieces planted in the ground, hundreds of thousands of plants can be produced from one individual within a few years! By this method all the excellent characteristics of the elite hybrid can be utilized immediately since every cutting will produce a tree exactly like its parent. Fortunately, research is showing that many tree species that do not root from cuttings naturally, can be induced to take root after treatment with growth-promoting chemicals.

In western Maine more than 10,000 poplar hybrids planted sixteen years ago bear mute testimony to the importance of hybridization. Every one of these hybrids has different inherent potentialities. Ten years after planting, the best of the new hybrids were from forty to fifty feet tall and from eight to ten inches in diameter, breast height. That represents a diameter growth at the rate of about an inch during a four months' growing season. By conservative estimate, poplar hybrids in Maine grow from two to three times as fast as native poplars. Incidentally, Dr. Schreiner set out the trees the same year his son was born, and when the boy was only ten years old some of the trees were large enough to cut for pulp tests. Remember, this is in northern country where the growing season is very short.

A word about the economic importance of hybrid poplars. Upon testing the wood of these trees, it was found equal to that of (Continued on Page 386)

Superstition, perhaps mixed with faith and some wishful thinking, accounts for—

Madstone "Miracles"

By CARRIE B. WILLIAMS

FAKE or fact, belief in madstones was common for hundreds of years. Travelers returning to Europe from the then Far East brought back stories of marvelous cures said to come from the application of these stones to the bites of mad dogs or venomous snakes. The belief persisted until late in the last century, when some of these stones were still bought and sold, one bringing as much as five hundred dollars.

Aside from the faith in any curative properties they are supposed to possess, such stones are of interest to the curio hunter. Few are known, and they are something to whet the zeal of any collector looking for the unusual.

Whether madstones are vegetable or mineral seems an open question. Analysis of some, however, shows them to be a hydrous silicate, with sometimes lime and potash present. One of the world's foremost authorities on gems and precious stones, George Alexander Kunz, identified some as tabasheer, a form of opal. This is a gem with the lowest index of refraction; is remarkably porous, with great absorbing power; is milky white in color and changeable like an opal, and shines with phosphorescent light.

A picture of a madstone looks like that of any other pebble but this is such a stone from the collection of L. D. Bertillion of Texas. It is about the size of an ordinary peach.

Tabasheer is found in the stalks of plants of the grass family, and has been discovered in diseased joints of corn stalks. It more often occurs in the hollow joints of certain species of bamboo and other large grasses. These plants, with their rapid growth, absorb much moisture. As this evaporates from the cells of the vegetable tissue, the stalks become hollow and dry, and the silica, which is held in solution, is deposited. At first it is a jelly-like substance, later hardening into lumps that rattle when the stalk is shaken.

The substance is highly valued in oriental countries for its supposed healing properties, and Arabian physicians are believed to have introduced it into Europe. The name is of Arabic and Sanskrit origin.

Tradition says that tabasheer is found also in the heads of snakes. Perhaps Shakespeare had this in mind when, in *As You Like It*, he penned the lines:

"Sweet are the uses of adversity,
Which like the toad, ugly and venomous,
Wears yet a precious jewel in his head."

Of similar import as madstones are bezoars, concretions found in the alimentary organs of goats and other ruminants, and frequently used to antidote bites. They have, for a nucleus, some small foreign substance that has been taken in with the feed and becomes coated with layers of magnesia or of phosphate of ammonia, and often mixed with hair. The stones from the stomach of a white deer were supposed to be of particular value.

There is said to be one certainly authentic madstone in the United States. It was brought to this country in 1776, and has been in one family for several generations. It is described as about two inches long by one inch wide and of chocolate color. When placed upon a wound it is supposed to absorb the poison and then drop off. The stone is then soaked in warm milk or water and is said to leave a greenish scum on the liquid. In one hundred and thirty cases of dog bite in which the stone has been used, no one is said to have suffered from hydrophobia.

Probably the most famous stone of the kind in the world is "The Talisman," upon the legend of which Scott's novel was based. The story of this stone dates back to the Third Crusade. Sir Simon Lockhart, a Scot, was a member of the military expedition, and took as prisoner an Arabian commander of high rank. The mother of the prisoner came to the camp to redeem the captive son. In paying the ransom a pebble inserted in a silver coin fell from her purse, much to her alarm. Her concern for the pebble aroused the curiosity of Sir Simon, who, thinking it was something of unusual value, refused to accept any consideration in which (Continued on Page 388)

Mantis and Mate

By ARCHIBALD HOWARD

Illustrated by Hexom

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"Sinensis, as I learned to call her, showed remarkable composure on the slippery top of my desk that morning as she looked out of the window at three brick walls and patch of sky, or turned her head to watch me over her left 'shoulder'."

WHEN my friend brought a praying mantis to my desk in Washington, D. C., one summer morning, it seemed a thing of passing interest; but I took the insect home with me, and it became something fascinating. For several weeks this mantis—a female of the Oriental species *Paratenodera sinensis,* imported to America half a century ago—shared my bachelor's apartment with me. She even lured in a mate for herself, and when she passed away she left eggs for another generation of her kind. I presume I shall never forget her, and the memory of those evenings I spent regarding her will always be exciting.

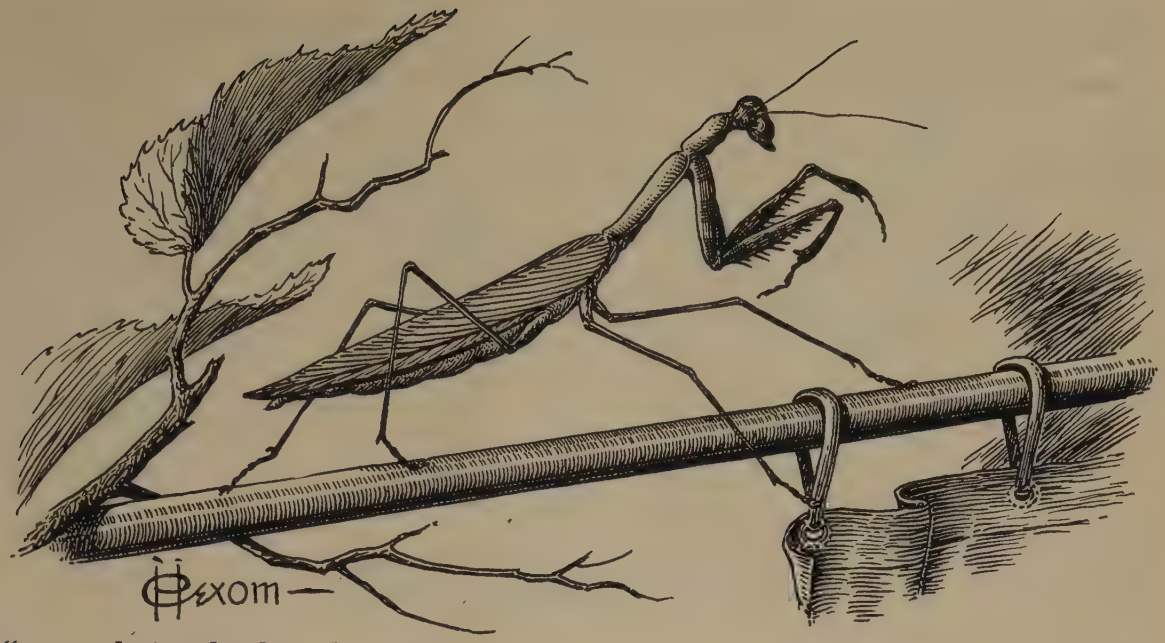
Sinensis, as I learned to call her, showed remarkable composure on the slippery top of my desk that morning as she looked out of the window at three brick walls and a patch of sky, or turned her head to watch me over her left "shoulder." Three inches long and strangely shaped, she seemed ungainly at first—a swollen abdomen like an elongated cocoon carried at the end of a monstrous thorax; a triangular head moving about under the strange prothoracic shield, out of perspective it seemed, like the turned head of an Egyptian drawing; bulging deep-green eyes; and her long extended legs, especially the heavy anterior pair then carried as awkwardly as an arm in a sling. But the delicate green—like an Antennaria leaf I saw in the woods in May—that bordered her wings was something of beauty, showing around the wings' translucent brown, a green petticoat hanging low below a brown dress. The deeper brown of the thorax and folded front legs was washed and touched with this green—a coloring that gave her a neatness offsetting her apparent ungainliness. She had iridescent underwings of deep purple, transparent in spots and lightly bordered with wine, that folded compactly like a fan carried on the arm. Underneath she was of many colors, reminding one of hillsides in late autumn, dull scarlet and wine, brown and yellow, and hints of green, the colors suffused but leaving a suggestion of two yellow streamlines.

Any suspicions of this creature's awkwardness ended abruptly with the release of a cockroach in her vicinity. Cautiously she slowly shifted her position and then unfolded those praying legs so quickly that I had no picture of them till once more they were folded, this time with her prey in them.

It was this display of fascinating usefulness that led me to cultivate the insect, to take her with me as I went home. There she lackadaisically made her way about the floor and the furniture, occasionally casting off her apparent lethargy to snatch food. Although she moved slowly, she traveled; and my first duty on entering the apartment each evening was to spy her out in order to avoid crushing her. At some time or other I found her in nearly every part of the room.

Later, for her greater convenience, I brought in a leafy branch and placed it in the bathroom, attaching it to the top of the doorway and to the shower-curtain rod. In this bower I placed Sinensis, and there she spent the most of her life with me, exploring that branch, promenading back and forth along the rod, and living on a roomful of grasshoppers that some boys along a Virginia roadside helped me catch. This mantis seemed to have come a long way from her kind, in an apartment bathroom four floors above Washington's Connecticut Avenue.

One evening as I was shaving, with Sinensis looking on over my right shoulder, I was surprised to see a mantis shadow on the frosted window glass to my



"... exploring that branch, promenading back and forth along the rod."

"... I was surprised to see a mantis shadow on the frosted window glass...."

left. It seemed most remarkable that she should be casting her shadow *beyond* the light. I raised the sash, and on the screen outside there was another mantis—a male, trim and neat and more graceful than the female; more beautiful, too, for his thoracic shield and large front legs also had some of that delicate shade of Antennaria green.

That was a moment of rare excitement and amazement. From her unnatural station on the fourth floor of a modern brick apartment house that female mantis had announced that she was heavy with eggs. Far below, probably in the wooded valley of Klingle Run, that male had started the long journey that ended far up that brick wall.

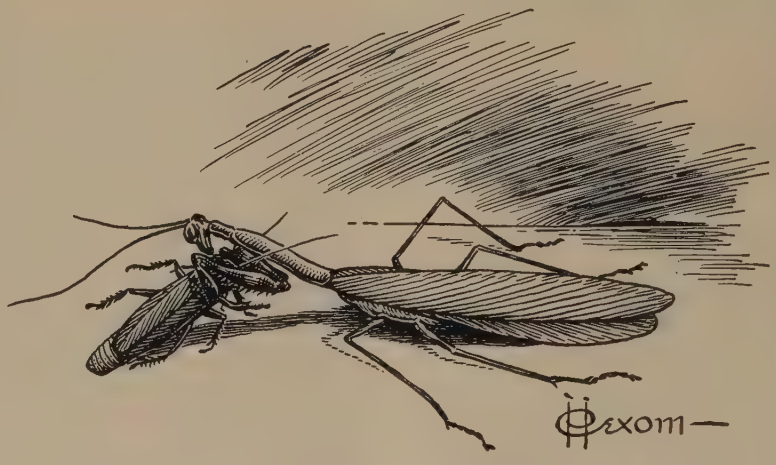
How the female had called one can only conjecture. Perhaps it was with a fragrance too delicate for human sense. Possibly it was with a note the vibrations of which were beyond the range of my ears.

Yet, running ahead of amazement, my curiosity was aroused. The evening's engagement was forgotten. I had read that the female mantis devours the male after he has fertilized the eggs, and I saw an opportunity to check my author. I raised the screen, and the male moved onward in his journey—across the window sill, along the wall, up to the top of the lintel of the door. Sinensis moved slightly when the male entered, and as he made his way toward her she swayed gently, to and fro. The male, waving his abdomen to the right and left, excitedly flagging his mate until at times he was almost doubled up, came quickly to the branch that extended from the doorway to the shower-curtain rod. He made his way along this branch more and more slowly. Sinensis, facing her mate, was hanging from the other side of the rod. The male stopped his forward movement, stood for several minutes, crouching, watching, throwing his abdomen from side to side. Then suddenly he leaped the eighteen inches between himself and

Sinensis so quickly that I saw only departure and arrival. He had grasped her with his strong forelegs over her pseudo-shoulders, having turned a half somersault in his leap.

Sinensis had not changed her position since the male entered the room, but almost as soon as he had her in his embrace she started to move, carrying him on her back. She made her way along the rod to the branch, along the main stem of the branch to a smaller one drooping toward the floor, and then she turned down. As she hung toward the floor, the male was in a precarious position. I saw that he had no grasp on her except that with his forelegs over her shoulders. And her shoulders were below him. With each movement Sinensis made, the force of gravity was carrying the male nearer and nearer to within reach of her "praying" legs.

The male was obviously much perturbed, eager now to leave the mate he had traveled so far to join. His forelegs were at the moment useless to him, but with his other legs he tried to hold securely to the branch and to the leaves. Yet every time that he appeared to have gained an advantage Sinensis would shift, slightly but enough to place him again in jeopardy.



"She died in November—a cockroach in her grasp."

I became convinced that it was only a matter of time until the male would come within reach of those powerful legs that I had seen unfold so many times to seize instantaneously their helpless victims. Sinensis was a third larger than her mate, and I knew that the outcome of a struggle would be certain victory for her. The male's chance was to leap away, and I had watched him into the early hours of the morning vainly trying to get into position for this.

Then the lamp bulb burned out, and I was suddenly too tired to replace it.

The fascination had been interrupted, and I was too much in need of eye rest to watch longer. And furthermore I was convinced of the outcome. So I went to bed. It was half past three in the morning. Since nine o'clock of the previous evening I had been watching these insects, and I was suddenly aware that within six hours I was expected to be in an office.

The next morning at seven-thirty the male was once more on the window sill.

Only a few days later he died. As a result of his mating he had lost one of his smaller legs, and if insects bleed he may have in this way been fatally weakened. He refused to eat. He had served his purpose in life, and apparently that was all of life there was left for him when he made his way to my apartment. Sinensis would probably have devoured him if she could have. Perhaps it would have been better had she succeeded. What was otherwise useless to Nature might then have helped nourish another generation.

Reasoning in this way, I concluded that the logic of Nature corroborated my author, although in the instance that I observed, the male escaped.

A few days later Sinensis laid her eggs, embedding them in a cone-shaped mass with its base attached to the under side of one of the twigs on her branch. The cone was formed of a thick, paste-like substance that she exuded from her abdomen, as she moved about in a spiral that ended with the tip of the cone. This substance apparently contained the eggs. The cone hardened, taking on a brownish hue like that of the insect.

I might have kept these eggs longer, continuing my observations throughout the insect's life cycle. But I learned of a university entomologist who was studying the mantis, and to him I took them.

Sinensis was a companion of a sort for me during the few weeks that followed. I furtively encouraged the propagation of cockroaches in my desk at the office, carried them home in a small box, and fed them to the mantis. Probably the warmth of the apartment and this special provision of food lengthened her life, but she was unable to resist old age. She died in November—a cockroach in her grasp.

Wildflowers

By OREN ROOT BROWN

"You can't get something for nothing,"
Is a very true saying, I'll grant;
But my fields are filled with blossoms
That I'm sure I never could plant.

The common garter snake is a familiar, harmless and valuable serpent, widely distributed and with an unknown number of varieties in America.

Although faced by many enemies and thoughtlessly and needlessly killed by man—

Garter Snakes Are Friendly

By HARRY EDWARD MILLER

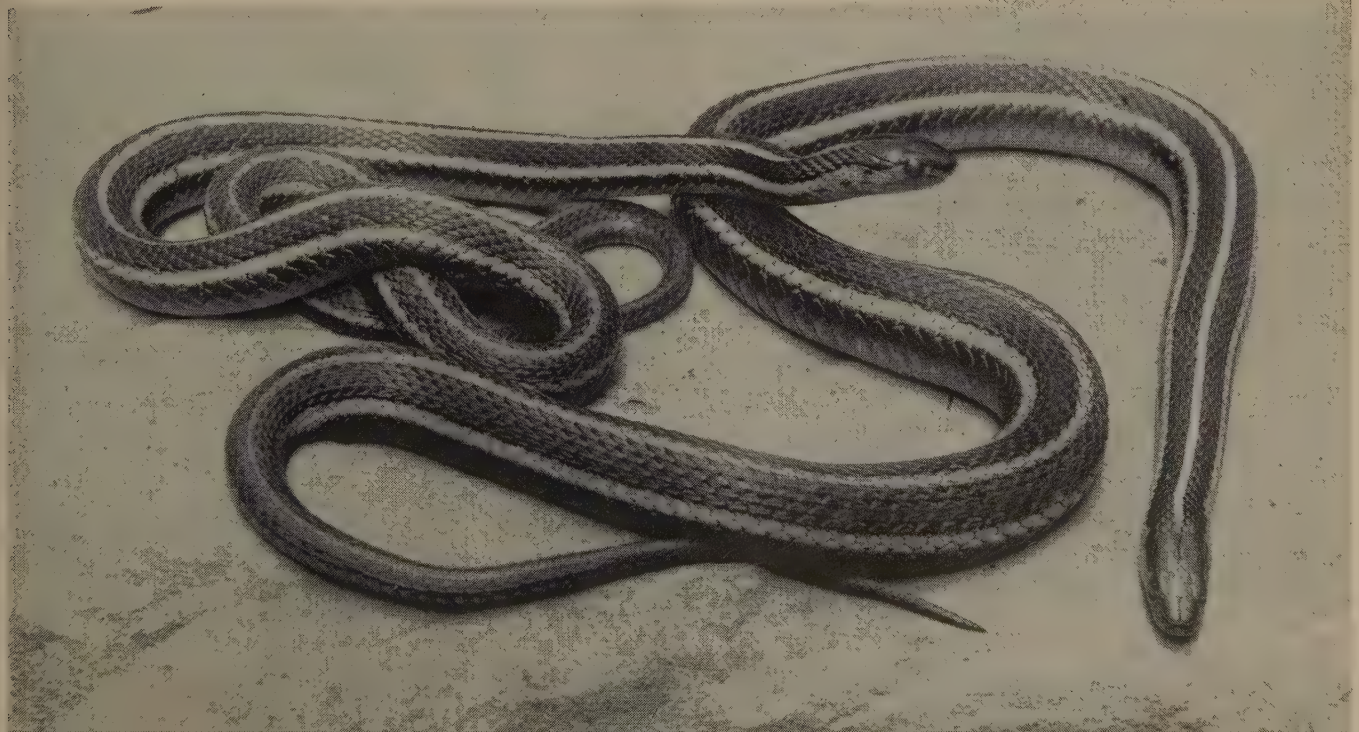
FROM the roadside a large female garter snake—frequently called a "striped snake"—moved quickly away, while near where she had been a half-hundred diminutive garters scurried off in various directions. These were her recently born young, for the garter snake is a viviparous serpent—one producing its young alive—in contrast to such a one as the blacksnake, known as oviparous—one that lays eggs and leaves them to hatch.

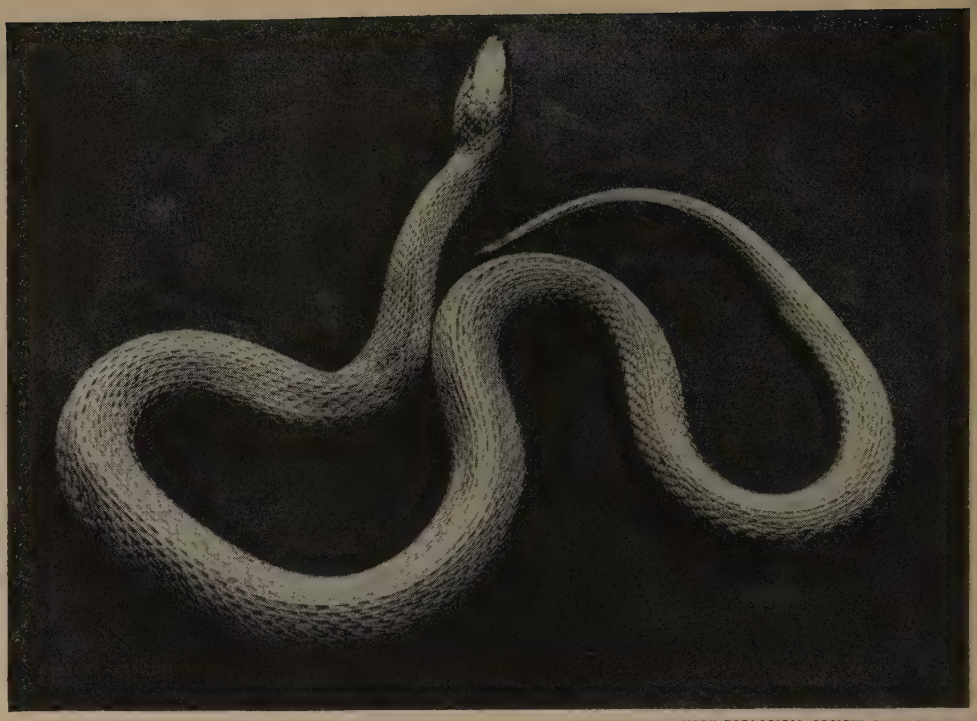
The garter snake and the common water snake usually have the largest families of any American serpents, and there are records of seventy or more garters being born to this most common of American snakes. It is the earliest of all serpents to appear in spring, sometimes being seen beside snowbanks in early March; and is latest in the year to go into hibernation, lingering to the very approach of winter and reluctant to go into death-like inactivity. They will frequently be discovered coiled in a ball of serpents for warmth waiting until spring calls them from their winter sleep.

For hardiness, as well as large families, the garter snake is noted throughout its range. It is an inhabitant of the greater part of the United States, and ranges up into Canada nearly to the 65th degree of latitude. Just how many types of the garter snake exist no naturalist has yet definitely established, but more than fifty have been noted in various parts of

Butler's garter snake is one of the many species and sub-species. It is found in western Pennsylvania and extends west into Indiana and Ohio. It is remarkable for its extremely small and dainty head. It is one of the so-called "striped" garter snakes.

NEW YORK ZOOLOGICAL SOCIETY PHOTOGRAPH





NEW YORK ZOOLOGICAL SOCIETY PHOTOGRAPH

There are occasional reports of albino garter snakes such as this striking example of departure from the usual.

the vast homeland of this little creature. There is the most familiar phase known to most people who notice serpent life. That is the common, dark-brownish to black type, with three yellowish stripes extending the length of the body, while underneath it is of a greenish-yellow tone. On the sides, when the skin is extended, the snake exhibits a series of whitish to pale - greenish spots, their pattern frequently suggesting a checkerboard. This type of the garter suggested the name striped snake, but it is by no means always striped. Certain types are clouded, with obscure markings and no bands; others have a body pattern like the broken links of a chain; still others a checkerboard-like arrangement of markings all down the length of the top of the body. This is called a " tessellated pattern." The latter individuals usually have stripes along the sides.

Albino specimens are occasionally reported. Another interesting type is that found in Ontario near the shores of Lake Erie, and at certain places in Ohio along the same lake shore. It is a true melanistic type; that is, tending to black. It is in appearance like a diminutive blacksnake, but it is a deep, rich black, with a white throat, and would not be regarded by the average person as one of the true garter snakes. Indeed, numerous students of serpent life seem almost unaware of the existence of this ebony phase.

Another type that is of marked interest is Butler's garter snake, characterized by its remarkably small and dainty head. This creature we find in western Pennsylvania, thence westward to Ohio and Indiana. Dr. E. B. Shelley Logier of the Royal Ontario Museum of Zoology, Toronto, and the foremost authority on the serpents of Ontario, reports that on a trip recently in search of rattlesnakes, he was much surprised to find this little serpent well established in Middlesex County, southwestern Ontario. This discovery, made in July, 1938, was the first record for Butler's garter snake north of the United States.

Young garters are born in August or early September, the young greatly resembling the adults, but they ordinarily have less distinct markings. From birth, like all other serpents, the young shift for themselves. The mother snake is not in the least concerned about her offspring, yet certain people, seeing young serpents near older ones, have wrongfully jumped to the conclusion there must be some parental care over the young. While many young are born, comparatively few survive, for they have many enemies, including humans, who think they have done something wonderful if they slay a serpent no larger than a lead pencil. Other snakes eat the young garters. Crows, ducks, grouse, wading birds, hawks and owls, all relish serpents as a dainty tidbit. Frogs and fish, cats, skunks, rats, foxes, and barnyard poultry, all take toll of young serpent life. With all these unfriendly hazards, besides the danger from grass and forest fires, the miracle is that so many garters survive to continue their race.

While the young at birth are small, old female garter snakes may actually measure a yard or a little more, while male garters usually do not attain a length of more than two feet and a half. Frequenting our yards and gardens, the garter is a sociable, friendly creature. It would meet man more than half way, but almost seems to realize man is the sworn enemy of all serpents. Man is the killer who slays snakes without regard to the fact that the harmless ones are, in most instances, the friends of agriculture. They deserve protection and not destruction. Gradually, however, the attitude is changing toward the harmless and beneficial snakes. Farmers and others are no longer so determined the whole snake world must be exterminated, for it is at last being realized that, by their consumption of armies of rodents and injurious insects, serpents are benefiting agriculture by millions of dollars.

There is seldom any more excuse for slaying a harmless serpent than a song bird. The garter snake consumes immense numbers of insects and eats mammals even up to the (Continued on Page 388)

There are many superstitions about honeybees, among them folktales that they have a high moral sense and will attack the wicked and transgressors with their stingers.

Lucky Bugs, and Others

By EDWIN WAY TEALE

Step on a cricket, and it will rain.

Release a fly buzzing along a windowpane, and it will bring you good luck.

Catch the first butterfly you see in spring, and bad luck will follow you all the rest of the year.

Count the spots on a hibernating ladybird beetle, and you will find a dollar for every spot you count.

If a honeybee circles around you, a letter is coming.

If a butterfly alights on your shoulder, you will receive new clothes.

Such are half a dozen of the innumerable superstitions that have been linked with the insect world. In all countries and all ages, these small, familiar creatures have been considered as connected in some way with misfortune and good luck. "Lucky bugs" and "soothsayer insects" are numerous in folklore. The commonest of everyday insects, at various times, have been supposed to have supernatural effect upon the weather and upon the fortunes of mankind.

Dream of ants, one superstition of early England has it, and you will be either happy and industrious, move to a big city, or have a large family. Whenever a stone has been overturned and an ants' nest revealed beneath, the stone must be replaced carefully, according to another belief, or bad luck will follow.

One early fall afternoon, I was plodding down a winding forest trail close on the heels of a Maine guide. Suddenly, my guide stopped. He pointed to a wasps' nest, hanging low among the bushes.

"We're going to have a mild winter," he assured me. "When wasps build their nests high, the snowdrifts are high. But when they build them near the ground, the winter is mild and snowfall light."

This belief is a weather-superstition that is accepted in many places. The fallacy lies in the fact that the wasp colony does not overwinter and hence it matters not at all to it how deep the snow drifts. A few fertilized queens hibernate outside the nest and all the workers of the colony die in the first freeze.

Wasp-lore contains other odd superstitions besides this belief of the Maine guide. In central Europe, girls used to place a piece of paper from a wasp nest in their clothing. This was considered an infallible charm that would make their suitors love them the more. Such insect paper was also prized by old people who believed that spectacles cleaned with wasp-nest fragments enabled them to see better.

Clay from a mud-dauber's nest, at one time, was held in high repute as a cure for boils. Such nests were treated with respect by housewives in some European countries because it was firmly believed that the woman who knocked down a mud-dauber's nest would shortly thereafter break all her dishes.

To the credulous, the actions of butterflies often have been matters of great concern. On a summer's day, if a butterfly found its way through an open door into a house, superstitious housewives believed that they soon would have a lady visitor and that she would be wearing a dress of the same color as the insect. Seen in late fall, a butterfly was considered a harbinger of early cold. On the other hand, when a mourning cloak was observed flitting about a woodland glade during a February thaw, the insect was regarded as bringing news of an early spring.

When a summer butterfly settled on the head of a young woman, the fact was accepted as an indication that she would have a new sweetheart. If one of these insects alighted on a person's hand, he was sure to receive unexpected money in the near future. Yellow roadside butterflies, clustered about a mud-puddle, were always skirted carefully by children who had heard the old folklore belief that disturbing such insects was the equivalent of

The seventeen-year cicada was believed to be a prophet of disaster. When it appeared, the "W" formed by the enlarged veins in the wings of the insect were thought to foretell "war, want, woe". At the right is a close-up of this sinister letter near the tip of a periodical cicada's wing. Since war, want and woe have been so often man's lot, the appearance of the cicada was coincident with the troubles that man had brought upon himself.

Although dragonflies have no stingers and are among the beneficial insects, they have been and still are charged with stinging horses and mules. And who has not heard about their sewing up children's ears? They are also supposed to bring bad luck to fishermen, although, actually, in their nymphal stage, they provide food for fishes.

"losing a pot of gold." And who would take such a chance?

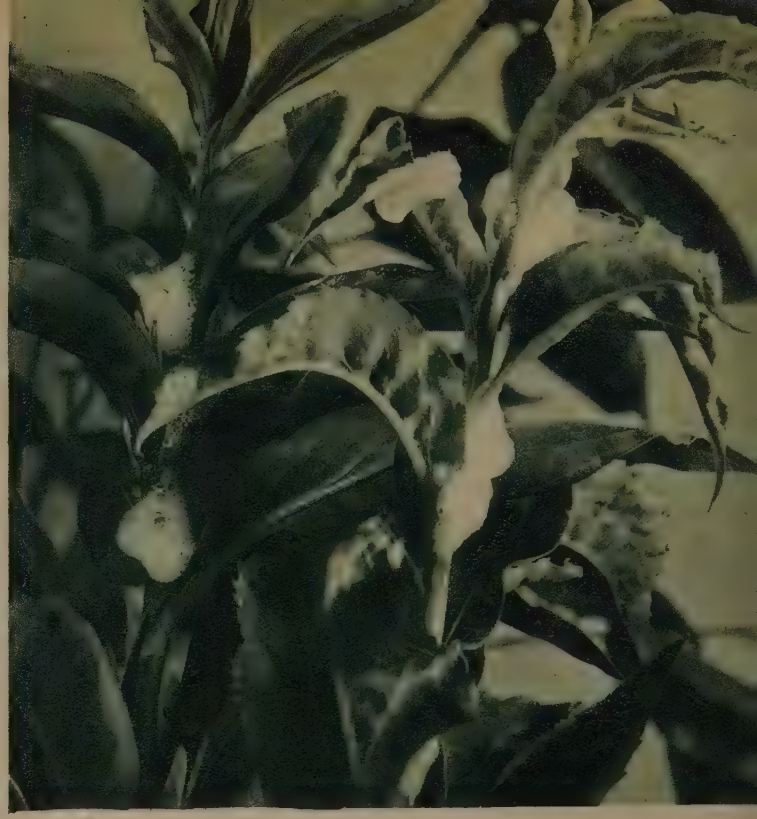
Those night-flying relatives of the butterflies, the moths, usually have been linked with somber superstitions. In many parts of the world, white moths have been thought to be the returning spirits of departed friends and relatives. In middle Europe, it was said that moths bewitched the butter by flying over the milk-pans or by crawling into the churns. When a moth singed its wings in a candle flame, its misfortune was considered to foretell sickness or dire calamity in the household. Electric lights downed this superstition.

The children of moths and butterflies also have their place in the realm of these oddity beliefs. When a woolly-bear caterpillar was seen hurrying across an open space, it was taken for granted that winter was close behind. By examining the width of the central band around its body, the gullible believed, the severity of the coming cold could be determined.

Among the English hop-fields, farmers always used

If a summer butterfly lights upon your shoulder you will receive a new outfit of clothes, according to an old superstition. This is only one of the many bits of folklore and superstition that are connected with both butterflies and moths, the former usually being of happier, and the latter more sombre, significance.

Trails left by leaf miners were at one time considered to be the signatures left behind by evil spirits. (Below) Ladybird beetles hibernating in the house were supposed to be a good omen, and if a person counted the number of spots on a beetle's back he was supposed to find a number of dollars equal to the number of spots.



Various superstitions were built up about the small masses of white froth that serve as incubating places for the tiny spittle insects, or frog or leaf hoppers. Negroes in the South will still tell you that horseflies will hatch from them. In Europe these are supposed to be "frog spit" or "cuckoo spit", although they have nothing to do with either frogs or cuckoos.

to pay close attention to the chrysalides of certain anglewing butterflies. Golden dots appeared on the sides of these chrysalides. When the dots were large, the hop-growers went about their work confident that the crop would be big and their profits proportionately large. Measuring worms, seen looping along a man's clothing, were often said to be measuring him for a new suit. When they were seen on a woman's hand, they were getting the size for a new pair of gloves. In some regions, the actions of the measuring worms were viewed with foreboding. They were thought to be taking measurements for a shroud.

Foreboding has been a frequent attitude toward commonplace actions in the insect world. Leaf miners, those small larvae that eat out curving and looping tunnels within the tissues of leaves, were formerly viewed with superstitious dread. The markings they produced were thought to be the signatures of evil spirits. Similarily, the "W" formed by the thickened veins near the tips of the wings of the seventeen-year cicada has been looked upon as a warning of coming "war, want and woe." And, when a swarm of honeybees settled upon a rotten limb, the fearful and credulous people in some of the counties of

The praying mantis naturally inspired superstitions, one of which was current in France and held that lost children had but to ask the direction home and the mantis would point. Pioneers believed that when wasps built their nests low it would be a mild winter and the snow drifts would not be high enough to reach the nests. But wasps, except some hibernating queens, do not overwinter. Let the housefly (below) buzzing along the window pane, alone, superstition says, and your restraint will bring luck. Swat it, we say.

England accepted it as an indication that there would be a death in the family.

Honeybees—so mysterious in their actions and for so many centuries closely associated with man—have been linked with a host of superstitious ideas. These curious misconceptions cover a wide range and include such oddities as the following: A bee-keeper must never count his hives or the insects will languish. No one can own more than ninety-nine hives; as soon as the number reaches 100, all the bees will die. If bees alight on a baby, it is an omen that the child will be eloquent. A stolen swarm never thrives. Bees never prosper at the home of a quarrelsome family. Bees are idle or unfortunate in time of war. At midnight, on Christmas Eve, the bees hum in a particularly musical manner in special celebration of Christ's nativity.

In several parts of the world, it is believed that the bees must always be informed of important news-events. Bee-keepers, in certain parts of England, used to inform the inmates of the hives whenever a political change or a declaration of war occurred. Unless the insects were taken into their confidence in this way, the apiarists believed, they would not thrive. When the master (sometimes any member) of the household died, one of the family was delegated to knock on the side of each hive and repeat: "The master is dead! The master is dead! The master is dead!" If this ceremony were neglected, the bees would fly away. In pioneer America, the same idea prevailed. Whittier's poem "Telling The Bees" is based upon this age-old custom.

In other ways, bees have been treated as members of the family. At the time of a marriage feast, the Breton peasants, in France, always dressed their beehives in red. When a death occurred in the family, in certain regions of England, black crepe was placed on the hives, or a stick, painted black, was thrust into the ground beside each hive. For generations, it was the custom in one English village to give the bees a formal invitation to every funeral.

A few years ago, in a small town in northern Florida, I encountered an insect superstition that was new to me. A boy of about twelve assured me that a praying mantis could cause blindness by "spitting tobacco juice in your eye." He even declared that he had heard of a boy in a town twenty-five miles away who had lost his sight in just this way. Thou-

The common woolly bear caterpillar was at one time believed to indicate the approach of winter. Its middle stripe was supposed to be an indication of the severity of the months of cold. The wider the stripe, superstition said, the colder the winter. Crickets, also, have something to do with the weather; step on one and rain would be certain to follow.

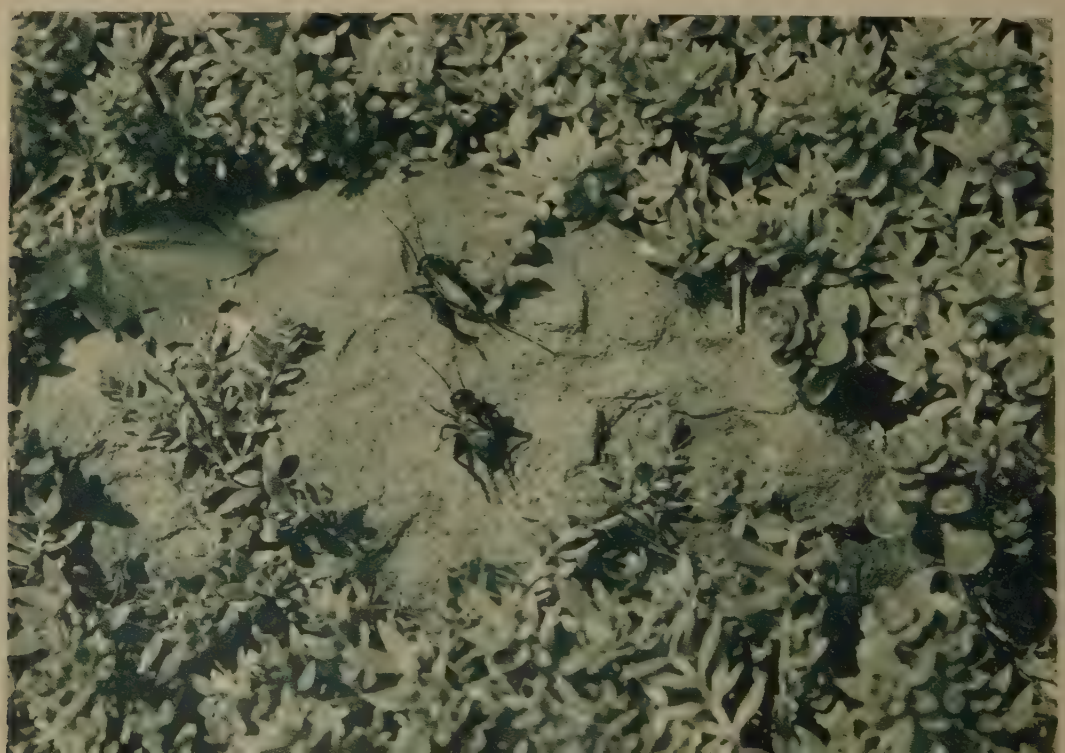
sands of miles away from the Florida town, across the Atlantic, French children believe another—equally unfounded—idea about the praying mantis. They call the insect The Soothsayer. When a child is lost, the mantis—if it is lifted from the ground—will stretch out its forelegs and point the way home. Similarly, American farmboys, for generations, have interrogated daddy-longlegs to find out the direction strayed cattle have taken.

Years ago, as a child on my grandfather's farm in the dune country of northern Indiana, I used to hear a curious superstition about houseflies. If you kill one fly, the saying went, ten more would come to its funeral. Another odd item on the list of fly-lore of that period was the belief that a fly buzzing about your face indicated that a stranger was anxious to meet you.

Ever since the days of Aristotle, people have been imagining untrue things about the small masses of white foam seen clinging to grass and weeds in early summer. Throughout Europe, they have been thought to be "frog spit" or "cuckoo spit." In reality, they are produced by small, soft-bodied immature insects that live within the protection of the froth until they reach their adult, winged stage. The foam protects them from the sun and from their enemies. A superstition of the South, accepted by many Negroes, is that horseflies hatch from the masses.

During winter months, insects of various kinds are thought to bring good luck to many people by entering dwellings for hibernation or for protection from the cold. A cricket in the house is considered a lucky portent in many parts of the world. To hear one of these insects chirping after a person has gone to bed, is believed to foreshadow extra good fortune.

Curiously enough, one of the most beneficial of our insects has been looked upon almost universally with superstitious dread. Superstition has it that dragonflies doctor snakes and even that they are evil spirits sent by Satan to plague the world. This is at wide variance with the truth. Dragonflies are, in reality, valuable friends of man. They catch and consume immense numbers of troublesome gnats and mosquitoes. Such facts are overlooked by superstition which, in the case of the dragonfly and the other insects—as in the case with everything else, is based on another foundation than the truth.



Kildeer get into the news frequently, both because they are interesting birds and because of the precarious sites they sometimes select for their nests. These may be the gravel of a railroad roadbed, or other similar spots that seem to create great odds against the successful raising of a family.

Nature-photographer W. Bryant Tyrrell worked with one mother killdeer that laid two sets of eggs. Her first nest was on the bare ground near some bushes at a government experimental station, the second was placed right in the middle of a lightly-used gravel road that ran about a hundred yards from the first site.

The second nest contained two eggs, to which the bird was very attentive. She would allow the photographer to come within a few feet before leaving the nest. On one occasion she remained, seeming fascinated by the camera lens and unmindful of the fly that walked up her back to the top of her head and was recorded in the photograph. When the mother bird did leave the nest it was always with the old device of a broken wing, which was supposed to lure the intruder away from the eggs. That failing, she would try to chase the photographer away with as menacing an attitude as possible.

Mr. Tyrrell placed the eggs in the palm of his hand to see whether the bird would sit on them. She would come to the hand and peck at it but not quite touch it. He is convinced, however, that if he had had the patience and the July sun had not been so hot, the kildeer would finally have accepted his hand as a nesting site and gone on with raising a family.

UPLAND PLOVER

This photograph by J. W. Jackson, taken on the plains in northwestern Colorado, shows an adult bird standing at attention, its plumage just fluffed by a summer breeze. The species used to occur in great abundance over an enormous area. It nested in suitable places from central Alaska and British Columbia eastward to Hudson Bay, south to our middle states, and nearly to the Pacific. It passes the winter on the grassy plains of South America from Southern Brazil to Argentina. Having no special enemies under primitive conditions, its numbers must have been beyond calculation.

The settlement of America by Europeans, however, brought dangers that threatened to sweep it from the face of the earth. The mere occupation of its grassy kingdom by man was not unduly serious, but the firearms he brought proved a menace against which no creature with succulent flesh can hope to cope, unless man shall learn to stay his hand. Its numbers began to lessen noticeably about 1880. Later the market hunter caught up with it in its southern winter home, and this may continue.

For some years the shooting of this bird in North America has been forbidden. This, and the stopping of traffic in game, have helped to bring back a few birds in some places where the species had disappared. But the lack of protection in Latin America is a serious factor.

WILSON'S PHALAROPE

The phalaropes are notable from the fact that, contrary to the general rule among shore birds, the female is the larger and more brightly-colored, does most of the courting, and permits the male to undertake all the brooding, and the care of the young. Furthermore, she frequently has two husbands, since apparently there are more males than females.

Wilson's phalarope is found in summer only in our western States and southern Canada, breeding from Washington, southern Alberta, Saskatchewan, Manitoba and Ontario south to Indiana, Missouri, and Kansas, Colorado, Utah and southern California. It winters from southern Texas, southern California and Mexico south to Argentina and Patagonia. It has not been found anywhere in winter in large numbers.

Although the female takes no part in the task of incubation, and joins the others in small parties while her mate is thus engaged, she retains an active interest in the success of the enterprise, and views any disturbance in the vicinity of the nest with great anxiety, apparently holding herself responsible for the faithful attention to duty on the part of her mate.

As We See It

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Wildlife Conference Reveals Trends

"Let us not be short-sighted as to the benefits to be had from the birds, the fishes and the animals. So often we consider their value to the hunter and his family. They once were the principal beneficiaries of this resource. Yet the time is not far off when those interested in wildlife for wildlife itself will far outnumber the gunners."

With these words P. J. Hoffmaster, Michigan Conservation Director and president of the International Association of Game, Fish and Conservation Commissioners, opened the sessions of the Ninth North American Wildlife Conference in Chicago. This was a surprising statement from a fish and game official, whose first loyalty is, naturally, to the gunners and fishermen. It was based, we found, on the amazing overflow attendance he had seen at various Nature lectures and meetings held recently in Michigan. This keynote statement was, we found, corroborated by others.

Conferences of this sort have a variety of values. They bring together leaders in the wildlife field, who deliver addresses on their several programs, problems and policies. They assemble technical men who deliver papers on their specialties. All these are later published by the sponsoring organization—the American Wildlife Institute—in a volume of transactions. But perhaps the chief value to be derived from the meetings is the opportunity to talk things over with people otherwise widely separated geographically; to discover their problems and their progress; to obtain a better picture of the wildlife conservation situation nationally.

"Pete" Hoffmaster's statement was so interesting that we set out, first, to discover how many agreed with it, and, second, to find out *why* it is a fact. We found unquestioned agreement, although in some cases somewhat grudging. We discovered various views as to the reason for the growth in non-killer interest in wildlife. Contributing factors seem to be the culmination of a quarter-century of considerable and widespread teaching of Nature study in the schools; the fruition of the emphasis on Nature interest with Boy Scout, Girl Scout and Campfire Girl; the cumulative result of the exposure of millions of Americans to the fine work being done by the park naturalists and ranger naturalists in National Parks and in State Parks; the reaping of the crops of Nature interest sown as seeds by such publications as *Nature Magazine*. It is felt, also, that the acquaintance with the outdoors that war service is now giving millions of men will add to this trend. The demand for identification guides to birds, flowers, and such, has been greater in the last two years than ever before, even to the exhaustion of publishers' supplies. Now that they are hard to come by more people seem to want binoculars for bird study; telescopes for scrutinizing the heavens; cameras for outdoor photography. Yes, in the postwar period the ranks of those interested in wildlife for wildlife itself *will* be greater than those interested in the game bag.

Another keynote that was dominant in the Wildlife Conference was breadth of conservation viewpoint. A few years ago game people thought only of what was target for the gun; foresters talked only of trees; fishermen thought of a stream only in terms of its fish population. Today, whatever the special interest or bias, most men and women even remotely entitled to the name conservationist think of the soil and its best use for farm, grazing, forest production or rehabilitation; of forests for timber, flood control, water conservation, and wildlife habitat; of streams as protected against pollution, serving their utmost biological purpose and exploited for irrigation or power only when such exploitation can be justified; of outstanding areas as properly preserved in park or wilderness.

Wartime conditions, as Ira N. Gabrielson, Chief of the Fish and Wildlife Service, told the conference, have curtailed long-range conservation programs and made some expensive demands upon our natural resources. But, he pointed out, there is a growing recognition "that all basic conservation problems are tied together." This was patent in the general addresses and the technical papers presented to the meeting. It was equally plain in many private conversations and group discussions. We could not escape the feeling that war demands, while necessarily costly in some directions, have served to bring into better focus the whole conservation picture; to give us a sharper negative from which we will be able to get a much better print in the post-war years.

We came away from the Ninth North American Wildlife Conference with a renewed confidence in the future of the conservation program. We feel that this

confidence is justifiably based on the promise of wider public appreciation of the issue and ability to understand it; on a broader view among sportsmen hitherto interested only in their shooting "rights"; on greater acceptance of the scientific approach, with more technicians available to carry it into effect. There remains to be effected a greater coordination between the several agencies—Federal and State—concerned with natural resources, but if the heads of those agencies will heed some of the very frank talk that took place at the Conference this can be done.

There is much to be done in regaining ground lost during the war period. Educational work now bearing fruit must be continued and increased. Post-war conservation programs must be based upon the best and wisest uses of our natural resources for both today and tomorrow. We have the knowledge and the experience to make conservation the vital force it must be of post-war America. Our country's future will be dark unless we do so.

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Who's Sentimental?

Sentimentalists and sentimentalism have been discussed in these columns from time to time. The term "sentimentalists" has been used by sportsmen as one of reproach to Nature lovers, conveying the meaning of impractical dreamers. Such are pronounced not fit to have any voice in conservation which, it is urged, must be managed by cool, level-headed, practical men. We have pointed out before that sportsmen are not necessarily of calm, judicial temperament, and that often in their own sphere prove themselves to be the rankest of sentimentalists. Those who toast, while eating, "My friend the bobwhite," or who show their professed love of the woodcock only by shooting it, are maudlin, no less.

Maunderings of one of this type of a past generation, that have recently come to attention, are of interest. They occur in descriptions of bow-and-arrow hunting of which the describer was a noted early exponent; he will not be further identified. In a leading magazine of the period, he gloated over the pleasures of killing various birds that have never been on the game list of any self-respecting sportsmen. Among them, he stated, "The yellow-bellied woodpecker . . . together with the hairy and downy varieties, has furnished me many a day's exquisite sport." This exquisite sportsman particularly enjoyed the chase of the great black or pileated woodpecker, one of the largest of this family of almost exclusively useful birds. About one of these he wrote, "My companion drew quickly, and let him have a blunt arrow; but it struck too far back, only breaking one of his thighs, and sending him off on a crazy, winding flight. After securing our arrows, we gave chase. And now the sport began in good earnest."

Of another decidedly non-game bird, he said, "When ——— and I get into the summer woods with our long-bows, the cuckoo is a favorite object of chase." Cuckoos are among the most beneficial of our birds, utterly inoffensive, and modestly beautiful, but to two sporting sentimentalists they were game.

Other than these, archers have shot meadowlarks for sport, but it is doubtful that any ever so confused esthetic appreciation of the lark's song with gastronomic enjoyment of the bird's flesh. Surely, in the following extract maudlinism attains its peak. "A plate of fried meadow-lark's thighs is something too exquisitely enjoyable to be left unmentioned in any writing or conversation touching [this] American starling. . . . Indeed, nothing is so sweet and soothing, so suggestive of tender thrills of sensual rapture, as a lark's thighs, unless it be the lark's voice."

In the same vein he continued, "Duck-shooting is, in its way, quite as delightful as duck-eating. . . . The wood-duck . . . is to me indescribably beautiful, and has always been my favorite game."

If this man really appreciated the sweet song and the loveliness of birds, how could he indulge in such orgies of killing and eating? How could he destroy for fun something "indescribably beautiful"? He did not see the incongruity of his speech and deeds, but regarded his doings as "fine" and "charming" sport, "which nothing could equal."

Who then is the sentimentalist, the loving Nature conserver or the emotionally befuddled killer?

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Two Birds

By JOHN ZIEGLER

The spot of blood that stains the sea gull's breast
Is all his color now. His monotone
Blends with the ocean's rock that is his rest,
Reflects gray waters that he roamed alone.
A hundred feet away the mournful crow
Lies at the forest edge. Death tossed him here,
Like crumpled velvet on the dirty snow,
To stir our anger and to touch our fear.
Two birds dissimilar: One born of sun
And waters, with wings like windy flowers;
The other with the lean dark look of one
Who has been sculptured in the moonlit hours.
But both were beautiful, as day and night,
And both were killed to make a show of might.

Salinas and Dry Lakes

By JOHN LINDSEY BLACKFORD

The great salina in the sink of Death Valley, a vast intermont trough deeply down-faulted between the Panamints and the Funerals, and the natural destination of the scant waters of this great area of interior drainage.

No more striking result of extreme aridity may be found in our desert Southwest than, paradoxically, the salina or wet-type playa lake. Down in poisonous sinks of the desert, shimmering like snow across the floors of furnace-like basins, salinas spread dazzling, encrusted salt fields, build saline hummocks and crystal pinnacles, and taunt, with bitter water of brine pools, the lost and luckless adventurer. They are the ultimate wastes, the last deadly mockery of many who pried too heedlessly into the desert's secrets.

Rainfall is so deficient and uncertain in these arid lands, evaporation so rapid, and the ground so porous that numerous intermittent streams descending from the mountains quickly sink and disappear. Others reach the barren basins and intermontane valleys below, to spread their sediments over extensive flats and yield their shallow waters to the sun. In wet seasons and after cloudbursts or flashfloods the mud-charged waters of these playa lakes are often of vast extent. Two weeks later the desert wind may whip up dust storms from their thirsty beds.

Salinas mark the sites of those ephemeral lakes where underlying, impervious rock formations hold the water table close to the surface, and maintain it there in water-tight basins. Occupying the floors of intermont troughs and valleys, in regions of interior drainage, such sinks have become not only catchment areas for the accumulation of desert fill—the rock-rubble and sediments washed down from the hills—but concentration basins for salts and alkalies leached from the rocks. They retain in their broad, undrained bowls the full tribute of the "bitter waters" of such uncertain streams as the Amargosa River, the Mojave, Salt Creek and other similarly mineralized flows.

In places the pasty, tenacious mud and ooze of salinas may be thinly concealed by "a dry, puffy soil into which the traveler sinks to his knees." Generally they are crusted with salts, and often surfaced with saline hummocks, and spires that reach a height of two or three feet. Sluggish channels of brackish water wind through the alkaline marshes. Salt pools rim their margins among the white hummocks with beautiful "flower crystals" recrystallized from the concentrated brine. Common and Glauber's salts predominate in the great sink of Death Valley. There the culmination of the salina appears as a violently agitated, white, frozen sea of illimitable extent.

This famous below-sea-level salina, which proved so perilous an obstacle to some of the forty-niners, stretches its gleaming salt fields and alkaline marshes for 40 miles along the narrow depths of that formidable depression. Soda Lake, the "Sink of the Mojave," in its baked, buff-colored basin, is another California playa typical of the wet type, as is also Searles Lake southwest of the Panamints.

Dry lakes occur under similar conditions of aridity, with the difference that porous, underlying rocks provide adequate drainage. Their wide, dusty beds, floored with hard clays or buff-brown muds, are common on the flats of the sun-besieged valley-basins. Evaporation sucks up the shallow waters that reach them after infrequent rains; and subsurface moisture drains away quickly through pervious formations beneath. Then these dry-type playas become again the playgrounds of dust devil and fickle mirage. Indeed only the combined magic of mirage and modern aviation could present some of the strange pictures we glimpse on these dry lakes today—those of land planes rising from rippling sheets of "water," as

though they came from an illusory silver screen.

Braun's Playa in southern Nevada, and Rosamond, Silurian and Silver Dry Lakes in California, are well known examples of the dry-type whose temporary waters vanish swiftly to leave dusty floors to the blazing sun. Other dry lakes are scattered over the Mojave. Many are found northward throughout the Great Basin Desert in Nevada, Utah and southern Oregon. Lake Abert in the latter state stretches many miles of dry alkaline flats beyond its limited blue waters, where I have watched long-stilted avocets parade the white-coated strand. In a word, salinas and dry lakes are among the most fascinating and bizarre of Nature's phenomena we find in our scenic West.

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Salutation

By PAUL CHURCHER

Winged bullet, lancer, insect pioneer,
Two hundred million years dare you defy?
Your glittering wings stirred Carboniferous dawns,
And yet you still go darting, flashing by;
Offspring of air and sun, mosquito hawk,
Snake feeder, darning needle, DRAGON FLY!

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"Stone Lilies"

By CARROLL LANE FENTON

QUARRYMEN at LeGrand, Iowa, sometimes find slabs of limestone that are covered with brown lumps and things that resemble chains of beads strung tightly together. "More stone lilies," the men remark. "Keep them for one of the fellows that come here hunting fossils."

The "stone lilies" really are petrified crinoids—animals that look like plants but are distantly related to sea urchins and starfish. In fact, a crinoid is a good deal like a starfish turned bottom side up on top of a long stalk. It gets food with its branched arms, which end in feathery pinnules that drive currents of water to the creature's mouth. The crinoid strains out plants and animals, eats them, and gets rid of the water.

And the stalk? It keeps the crinoid in place, yet allows it to sway to and fro in water where food is plentiful. Root-like things at the lower end of the stalk anchor it to the sea bottom. Only a few crinoids lack stalks, drifting about on the sea floor or clinging to other creatures with their arms.

During the early part of the Coal Age, huge banks of crinoids lived in a sea that covered the Mississippi Valley. When they died, their bodies and stalks toppled and sank into the soft mud. Other layers of mud settled upon them. Thus the crinoids became almost perfect fossils, such as those in this slab from LeGrand. Other fine specimens are found at Crawfordsville, Indiana.

In other places the mud was not so soft, and the dead "stone lilies" rolled to and fro. Their arms and bodies fell to pieces, while their stalks broke into sections or single joints which children sometimes call "Indian wampum." When these fragments did mix with mud and harden they formed beds of coarse rock known as encrinal limestone to those who deal in geology.

Rabbit versus Reptile

By JAMES W. KIMBALL

My work as a wildlife biologist for the Nebraska Game Commission brings me into contact with many interesting wildlife observations, but my notes for August seventh, 1943, have a red check in the margin.

I was driving north on highway 15 in northeast Nebraska when a bull snake started across the road in front of me. He left the weeds on the west side of the road and was traveling quite fast—as though he had a definite destination in mind. When he reached the middle of the road a cottontail rabbit jumped out of the weeds on the east side and started across the road in the opposite direction. She met the snake in the middle of the road and he struck at her. I had stopped the car about 30 feet back, but another car came from behind and after passing me it swerved to miss the rabbit and the snake. This frightened the rabbit back to the east side of the road, but the snake remained. The driver of the car stopped for a second, but, rather than be a minute late to something, he drove on and missed a rare show of Nature in the raw.

At first I thought the cottontail and snake had met by accident, but this interpretation of the phenomenon was soon abandoned. The dust of the passing car had hardly cleared away when the rabbit reappeared and attacked the snake. She did not fight with her front feet at all, as I have seen jackrabbits do, but attempted to stamp the reptile into the ground with the powerful kicks of her hind feet. She would kick so hard that it would throw her three feet or more into the air. At times it looked as though she was both biting and kicking. However, the action was so fast that I am not certain of the biting. The bull snake continued to strike savagely, and kept frantically undulating its body in an apparent effort to elude the kicks. Several times its strikes found their mark but the rabbit was able to loosen the grip by leaping into the air. Finally the snake got a grip on the rabbit's left flank and held tight. The rabbit jumped into the air but the snake went with her. She even lay on her side and kicked, but still it held on. Finally she ran back into the weeds on the east side of the road with the snake still clinging. Here the fight continued.

I walked up to within about twenty feet of the fight. The weeds were low so I could see the rabbit but not the snake. After a timed four minutes of fighting the rabbit hopped five or six feet from the battle ground and waited for about a minute. Then she went into tall weeds and I heard her thump the ground twice, as though she might have followed the snake and was giving it a parting kick or two. In view of later developments it may have been a warning.

Now the fight seemed to be over so I went into the roadside ditch to see what I could find. A long search assured me that the reptile had gone. It probably went into the cornfield to the east. However, just as I was about to give up the hunt I spied a very tiny baby rabbit, then a second one, and finally a nest containing two more. They were so young that it was no trouble to pick them up and it was plain that their stomachs were very full. Probably they were being nursed when the snake, directed by smell, started for the nest but was intercepted by the mother.

I set up my camera and took some pictures of the young and the nest. While handling one of the young it squealed, and, hearing a noise behind me, I turned and saw the mother rabbit bound straight toward me out of a patch of weeds about fifteen feet way. For a second I thought I was to suffer the fate of the bull snake, but she flashed her cottony tail and returned to cover. Some call it preservation of the species, some call it instinct, and some call it mother love. Whatever we call it, it was a potent force.

Finding how Odynerus carries on her kind provides interesting—

Wasp Watching

By CARL G. HARTMAN

Assisted by Paul and Philip Hartman

View of the cut end of a rubber tube that was taken over by an *Odynerus* wasp, stocked with food for its future young and in which the egg of the wasp is suspended.

"Look out! Yellow-jacket nest!" This warning has a meaning to everyone who has roamed with comrades over field or through woodland. "Wasp" means to them swift pursuit and hot landing by one of the world's original winged fighters.

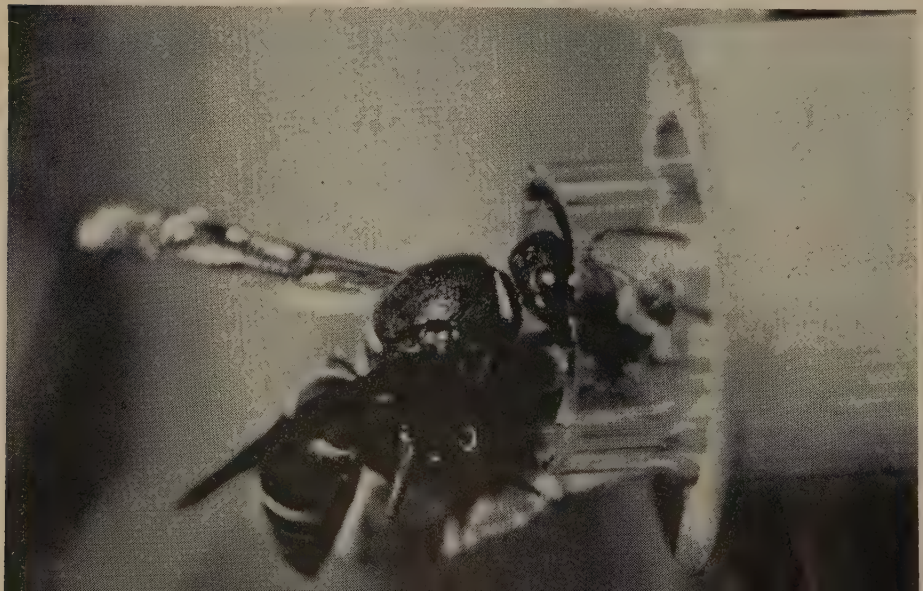
Yellow-jackets and hornets are known as "social" wasps because they build communal houses, which become more and more populous as the season advances, for, as the offspring reach maturity, they join the colony as workers and fighters. Since it is all important that the colony be preserved to the end of the season, these wasps are endowed with the instinct of defense, and Nature has taught them that the best defense lies in attack.

This is not so with that other, and vastly larger, group of wasps known as "solitary." As the name implies, each female (it is the female that does all the work) engages in her household duties individually and alone. With some exceptions the male dies soon after mating, hence is seldom seen, even where females are plentiful.

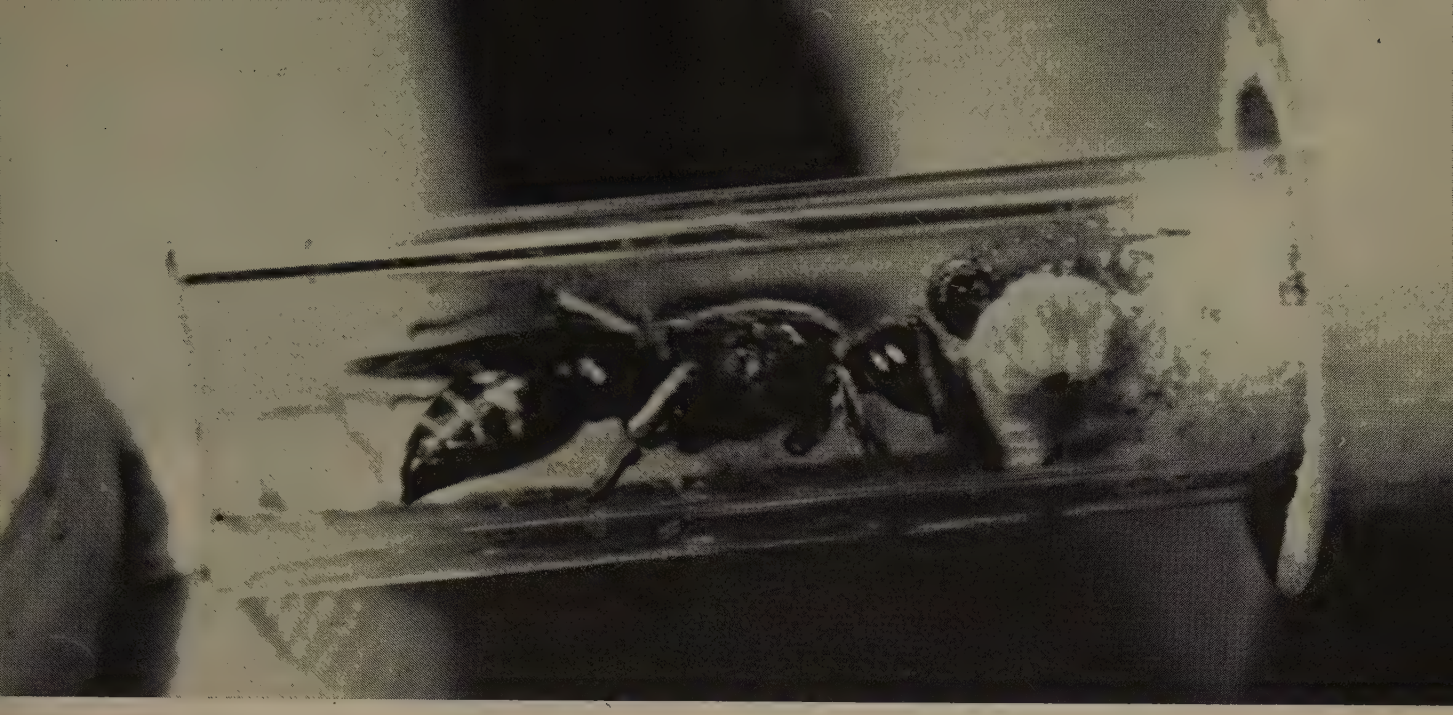
Working alone, often in hidden cracks and crannies, these wasps do not intrude themselves upon our attention, hence are not generally appreciated. They have no permanent abode, but make their simple nests in different, often widely separated situations. Although rarely seen, they exist in such variety of size, shape, color and habit that it would take years of study to know even those that may occur in your own back yard. They are, moreover, quite inoffensive towards their human company, so that some of us have come to think of them as almost domesticated, even the biggest and most vicious of them, like the yellow-banded, cicada-catching *Sphecius*, or the orange-winged *Pepsis*, nemesis of the big hairy tarantula.

As a matter of fact, the solitary wasps are really well equipped with sting and jaws, for they are all huntresses, their offspring without exception being carnivorous. The mother wasp prepares a nest, stings and paralyzes its insect or spider prey, and carries it home to store as food for its offspring. The prey is seldom killed outright, only paralyzed so that the wasp grub may have a complete and sufficient larder of fresh, unspoiled meat. Each kind of wasp specializes in a particular kind of prey. Thus *Odynerus*, the subject of this story, brings in only luscious caterpillars for the developing young.

The nests of solitary wasps are of infinite variety. Most solitary wasps are diggers. Their



The wasp arrives at the entrance of the glass tube with a caterpillar to be stored in a mud-walled compartment as food for the grub of the wasp.



A mud partition having already been installed, the wasp pushes the caterpillar tightly against the wall. The prey has been paralyzed so that it will be live and fresh meat for the grub that will hatch later.

nests vary from an inch to six feet in depth, the size of the nest being roughly proportionate to the size of the wasp. The next most numerous group build nests of mud, moss, or wood fiber, sometimes with great artistry. Our friend *Odynerus*, however, is only a tenant, for she neither digs nor builds her nest, but occupies ready-made cavities, such as old beetle burrows in wood, or deserted mud-dauber nests from which the original occupants have emerged. She is extremely practical and adaptive, for we have found her stopping up keyholes, occupying empty cartridge shells, dwelling in rubber tubes.

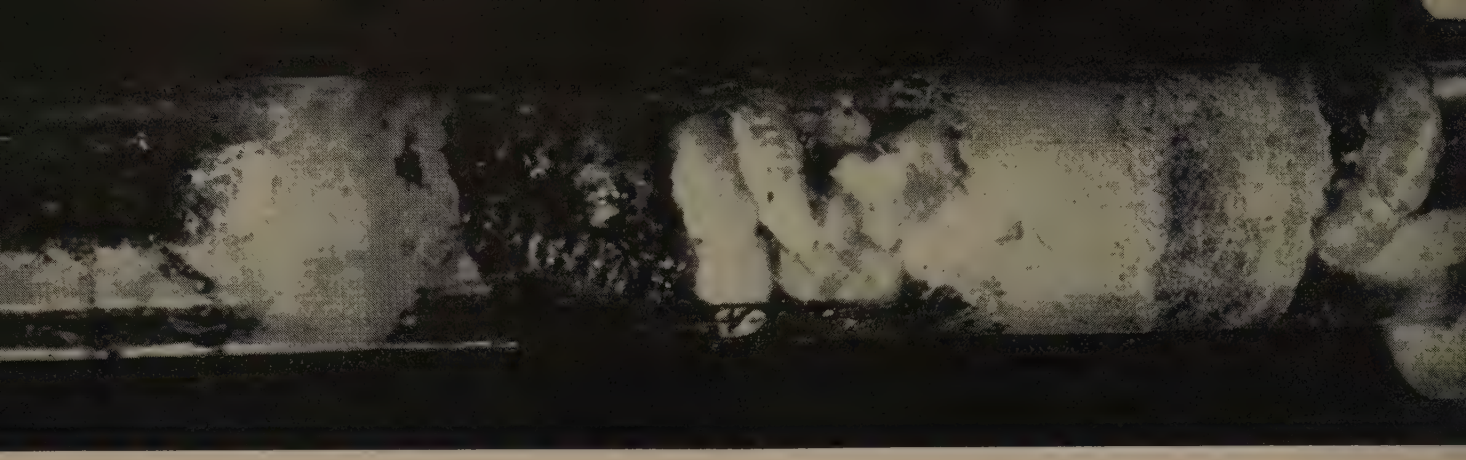
Knowing these eccentricities of these wasps, we were able to attract them to our window sills or garden posts by tacking up short lengths of bamboo tubing. In favorable spots no tube ever lacked a tenant for long. If *Odynerus* did not happen along, then some other wasp or a bee did. The bamboo tubes, when filled, could be gathered up and split with a pen-knife to expose the contents. In this way we were able, at our work bench and under the microscope, to watch the egg hatch, the larva grow and spin its cocoon, and, eventually, to see the wasp emerge as an adult.

Such a bamboo tube might contain a number of chambers, each occupied by a wasp grub, separated from others by mud partitions. And, of course, the end is always well sealed with mud to keep out insect plunderers of all descriptions.

While one may thus observe his tenants of the bamboo houses come and go, and watch them bring in prey or pellets of mud, one would still be in ignorance of their manner of work within the dark depths of the tubes. We were curious about these secret activities, not yet known to science, while we were studying and photographing wasps at "Holiday Heights," our vacation grounds in central Connecticut. Necessity again proved the mother of invention. What could be simpler, we figured, than to offer these tube-loving insects tubes of glass in place of opaque bamboo for their nests? The only question was: Would the insects work in glass? To our joy, the wasps chose to live in glass houses, literally. With eyes for seeing and films for recording, we were able, by this method, to bring to light many of the formerly hidden activities of these toilers in the dark. The method proved effective and simple enough for amateur and professional alike.

To attract the wasp in the first place, the glass tube had to be in the dark, hence was slipped loosely inside bamboo or rubber tubing. Only after the wasp had entered and was engaged in her labors could the tubes be pulled out for observation with-

Odynerus is closing up a nesting site in a bamboo stick with a mud plug. This plug is moistened with water from the insect's crop, which adds secretions and makes the mud wall more or less waterproof and excellent protection against other insect marauders.



out disturbing the housekeeper. To increase the chances of getting tenants, several tubes were attached to a board and this placed in a spot convenient for the observer. One site was in the shade of a tree, as shown in the picture. Sunlight for photography was provided by means of mirrors, for it was essential that all the light fall on the glass tube obliquely in order to avoid right angle reflections from the surface of the tube. It was soon found that, after the wasp had entered the tube and begun her task, she seldom objected to being exposed to the light. For convenience in pulling out the tube a strip of adhesive tape was attached to it, the tape also serving as a landshelf for the wasp.

The glass tube used for a nesting site, bamboo at right. Two mud partitions are seen, one double. Seven caterpillars are in one completed cell and an egg is in the new cell at the left. Below we see the manner of placing the tubes so that goings and comings can be watched and recorded in motion picture.

Let us, then, sit down before our tubes and watch—and we may as well be comfortable and relaxed, for there will be long periods of just waiting. First, Madame *Odynerus* will be seen investigating the neighborhood, examining anything like a rusty nail-head, for example, that might be an entrance to a burrow or roundish crevice suitable for a nest. Presently she enters one of our tubes, passes in and out a number of times and flies away. There being no way to read her mind, we at first do not know whether to take down the "For Rent" sign or not. But soon our suspense is over, for she returns with a pellet of mud. The pledget of cotton with which we plugged the lower end of the tube does not suit her —only a mud seal of her own making will satisfy. That done, the house is finished and provision for the offspring is the next step.

Most solitary wasps catch their prey first, then lay their egg on one of the paralyzed spiders or insects brought in. Each species follows a rule as to the exact spot on which the egg is placed. Not so, however, with our *Odynerus*, nor her near relative *Eumenes*, the potter, nor any other member of the family Eumenidae. These all lay the egg first, suspending it from the ceiling of the chamber by a delicate thread, where it dangles neatly.

Soon after the end of the tube has been plugged with mud to prevent attacks of marauders by the back door, or after the completion of a mud partition sealing off any completed cell, the egg is laid close to the mud wall. To do this the wasp must back in so that the tip of the abdomen almost touches the wall. Unable to turn around in our small tubes, she is seen to come out, turn around outside and back in. This act is an invariable signal for egg laying, and the happy ending, perhaps, of a long vigil on our part. We pull out the tube and await results. Presently the wasp lies on her back and begins slow rhythmic contractions of the abdomen, four or five times slower than the usual, warm-weather breathing movements. When she is discovered in the act, an observer on duty may call out: "She's pumpin' an egg." A bit of mucus appears at the tip of the abdomen, is touched to the ceiling, drawn out into a thread like a bit of chewing gum. The thread hardens immediately on contact with the air. Further movements expel the egg, which in several minutes is free, and when the wasp withdraws her abdomen the large egg is seen dangling from the ceiling. A motion picture helps us recall these stirring details as we write these words, for we captured (Continued on Page 388)

G. I. Chimp

By Staff Sgt. GEORGE ABRAHAM

IF THE American soldiers at this African base, or any other African outpost, have their way about it, the troopship that one day will carry them home is going to be loaded with chimpanzees, boa constrictors, birds, monkeys and other assorted fauna. It is a strange thing what war will do. Soldiers who, in civilian life, could not handle a house cat have taken a great liking to the animal kingdom, and it is likely their dooryards after the war are going to be teeming with pets.

The commonest animal morale builders—and incidentally the most ferocious—that most soldiers will see in Africa are the chimpanzees and monkeys. They may be in the same family, but there is a whale of a difference between the two. Monkeys are more active and mischievous, but are less spectacular to GI's than are chimpanzees. They do not have that rib-tickling quality the chimp has. Few things are funnier than a frustrated chimp who does a complete flip in mid-air, curls his lips, shows his powerful molars, beats his hairy chest with King-kong fury. Those are the contortions he may go through if no one offers him coffee in the morning, or if he is refused a ride in a jeep. Monkeys do not put on such a show. They make a lot of din, and spend their time scratching fleas. If they do not have fleas, they scratch anyway.

To the soldier, the chimp is king of the jungle. The one we have gets all the privileges of a king. He sleeps under a mosquito bar (chimps can get malaria), eats the same food GI's eat, stands reveille (which is not a privilege), goes to movies, and gets a bath, twice

Billy-O is the favorite pet chimpanzee of an outfit of Yanks in tropical Africa. He lives under a mosquito net, eats soldier food and gets washed twice a week.

weekly. He has an insatiable mania for beer. After drinking his capacity—one quart—his belly swells to the size of a basketball, and is just as hard. He suffers the same ailments as humans—head colds, chiggers, gas on the stomach, the latter usually coming from overeating. He sneezes and hates snakes. One chimp we had showed remarkable capacity for taking electricity. Twice he grabbed hot wires carrying 13,000 volts. The only results were burned fingers and toes, and he pulled through. He doctored himself by instinctively chew- (Continued on Page 386)

Billy-O loves beer and his capacity is a full bottle, whereupon his belly swells up to be as large as a basketball and just as hard.

G.I. haircuts are proverbial and regulation, so Billy-O, being a good G.I., submits to having his locks trimmed like the rest.

MCFARLAND PHOTOGRAPH

Bulbs bring beauty to a world in which war has upset sources of supply, but it is still possible to obtain these—

"Bombs of Beauty"

By ANDREW S. WING

Members of the narcissus tribe, such as these yellow trumpets, offer the best buys on the bulb market, in view of the shortages caused by war.

WAR changes everything, and the hardy bulbs that brighten our gardens from spring to late autumn are no exception. No investment in garden beauty pays better dividends, considering both original investment and the length of life that many of the hardier bulbs enjoy. But what is the situation today? Where are the bulbs that we normally import coming from?

Until our armies liberate Holland, the colorful land of dykes and ditches, whence came most of the tulips and other imported bulbs, no one will know exactly what has happened over there. But the Dutch bulb dealers in this country, many of whom are Hollanders with relatives still in the Netherlands, have hopes that the precious bulbs over there are safe.

"The Germans who occupied Holland were not so stupid as to destroy the bulb industry, as was first reported," one of these men told me. "You see, the Germans love flowers too; but more important, they realized that the bulb farms in Holland could be made a very real source of profit. They therefore bought the bulb crops from the growers with ersatz paper money. They then sold the bulbs in Sweden, Switzerland and Germany, thus realizing a very nice profit which went into the pockets of the Nazis."

"But supposing the Nazis flood the country by cutting the dykes, as they have frequently threatened to do?" I asked.

"I don't worry too much about that," he said. "The bulbs are grown in a narrow strip of land just behind the dunes, which line the coast. The ground is high enough so that if the country were flooded, the bulb fields will still be a few feet above sea level. I believe that they will come through all right.

"My own brother, from whom I heard just before Pearl Harbor, wrote that he was taking the paper money from the sale of his bulb crops and buying more bulbs to put back in the ground. He figures that even if the paper money is worthless after the war, the bulbs in the ground will still be worth par value."

Another Dutch-American grower told me that he had heard from his relatives in the old country as recently as April, through the underground, and that his father had won a prize with a new tulip at a Holland show in January. This is further evidence that the bulb business in the Low Countries is being carried on.

Stories like these give one reason to hope that things will be better over there than we had thought possible. Reports add weight to the old adage that "You can't beat the Dutch."

The Japs lost an important source of income when they cut off our market for their bulbs and other horticultural products. One of our leading bulb importers told me that we had bought from the Japanese as many as 20,000,000 lily bulbs in one year. He went on to explain that, while Bermuda has received much publicity because of the Easter lily bulbs and plants she sends us every year, the total imports were actually very small as compared with the imports from Japan. The Japanese lilies were mostly used for forcing, and were generally not of

MCFARLAND PHOTOGRAPH

Although Galanthus, or snow-drop, may be considered among the lesser bulbs, they should not be overlooked. They require little care and can be left in the ground for years without division, or until they become too crowded. They will help, however, to round out the garden plan in times when the choice of other bulbs is limited.

first quality although adequate for certain markets.

England will send us few bulbs this year. Earlier in the war, we did receive fair-sized shipments of tulips and some narcissus bulbs from England. But the English are great flower lovers and covet many more bulbs every year than they can produce. Now that the Holland source is cut off, the English need all the bulbs they can grow, despite the fact that more gardens and estate land have been converted to food crops than ever before in the history of the British Isles.

All this adds up to the inevitable conclusion that bulbs for fall planting will be none too plentiful this year. So get your order in early. All the bulb specialists with whom I have talked agreed that the demand is much greater than the supply. The purchasing power of the average American is higher than ever before, and, even with the emphasis on Victory Gardens, there is a great and increasing demand for flowers and other ornamental plants for home beautification.

To be sure, the bulb business is this country has been growing at a healthy pace for twenty years, and has received a new stimulus from wartime shortages. We can grow bulbs in favored sections as well as they can on the other side of the water. But bulb growers are faced with a serious labor shortage, and receive no priorities on labor, fertilizer or supplies since bulbs are on the luxury list. Until the war is over, our domestic bulb production must, therefore, remain at a standstill. Furthermore, as one bulb man pointed out, even if the labor were available, we do not possess in this country the stocks of small bulbs necessary to expand production to any great extent.

However, there will be bulbs for sale and bulb enthusiasts should order from dealers or reliable catalog houses as early as possible for fall delivery. It is wisest to order good quality bulbs of the better varieties, but not necessarily the higher priced novelties, scarce items, or the largest sizes, which are better for forcing anyway.

In many of the older gardens there will be crowded clumps of bulbs, particularly narcissus, which are available for dividing and replanting. Narcissus clumps (including both daffodils and jonquils) should be divided every few years or they will stop blooming. Tulips should also be lifted and divided at least every three years, or else they will become smaller and smaller through division, and eventually disappear altogether. Some of the lesser bulbs, such as grape hyacinths, crocuses and snowdrops, can be left in the ground for many years without division. Eventually, however, they will either become crowded, stop blooming, or peter out entirely.

Some years ago, when developing a new garden, I picked up a bargain lot of small grape hyacinth bulbs —something like a quart for a dollar, as I remember it. Few of the bulbs were blooming size, so I dug a broad trench in the garden and scattered them in it as thick as if I had been planting peas. The row was fertilized and kept weeded. Within a year I had a lot of bulbs of blooming size, which were transplanted to various parts of the garden. I remember having one row along a hedge that was seventy feet long. But every year overlooked bulbs kept turning up in the garden row, displaying their bonny blue heads in May. I would harvest them, and the next spring there would be more. Some bulbs are like

that—friendly and easy to grow. Others are finicky—here today, gone tomorrow.

The advice of one of the wisest bulb men I know is to spend most of your money this year on the narcissus tribe rather than on tulips. There are more narcissus bulbs, in the first place, and they will be better buys. Healthy, disease-free daffodils and jonquils are a good investment in beauty for any garden, even at war-time prices. Five years from now, when your bulbs have multiplied perhaps five-fold, you will have forgotten the price you paid.

When it comes to bulb values, the axiom in the trade is that cheap bulbs are never a bargain. Usually, they are either undersized, or, worse still, diseased, or mixed lots of poor, outdated varieties. Buy from a reliable dealer or mail order house. Study the catalogs and choose the varieties you like. Sometimes the better dime stores have good tulips and other bulbs. But make sure that the bulbs you buy are clean and disease free. If they are lilies, watch out for infected bulbs, for these will not only be a waste of money but they will infect your soil with disease organisms that it may take years to overcome.

MCFARLAND PHOTOGRAPH

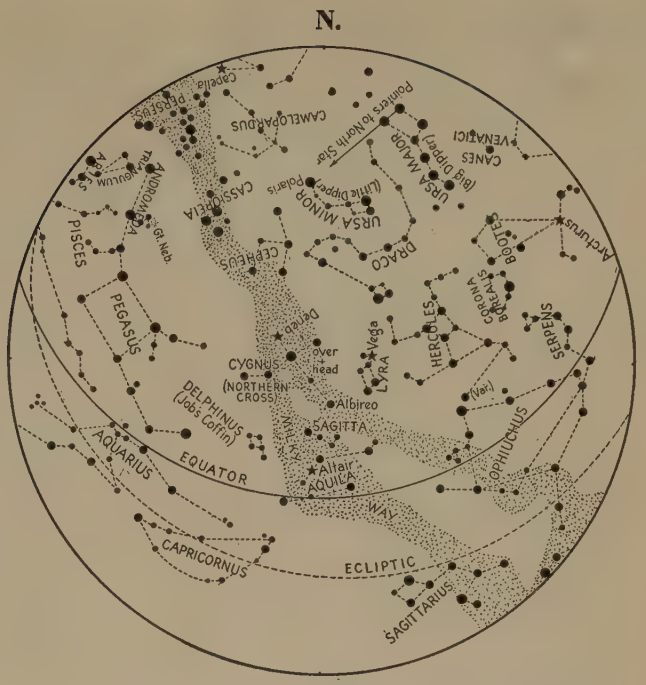
Tulips will be scarcer and the wise buyer will purchase from reputable dealers, ordering the good quality bulbs but not necessarily the rarer or higher-priced novelties, such as they may be, in the catalogs this year.

Most bulbs are easy to cultivate. These "bombs of beauty" come loaded with bloom. If you give them the very minimum of care they will flower nicely the first year. After that it is up to you, except for the tough little fellows we use for naturalizing. Tulips, narcissus and hyacinths for bedding *do* respond to good care in planting and fertilization. The ideal soil for bulbs is one that is a deep, mellow loam. The site should be well drained as bulbs abhor wet feet. Fertilization with bone meal, a good chemical fertilizer, or a layer of well-rotted cow manure on top will pay. The fertilizer should be applied at the time of planting, or immediately afterwards. Prepare the ground somewhat in advance of planting time, if possible. Deliveries of bulbs are liable to be late, and you will wish to get them into the ground as soon as they are received. The ground should be spaded at least eight inches deep, except where the bulbs are to be set into the perennial border or in odd corners of the lawn. Be sure to follow directions as to planting depths. These vary according to the spaces and size of bulb. It is hardly necessary to suggest that the bulbs be set right side up—tip up, base down. And do not make the mistake of setting them so close together that you will have to move them again the following year. A mulch of straw, manure, or other litter is desirable but not absolutely necessary.

The day of the formal bulb bed is past, thank goodness, except in parks or large estates. Blend your bulbs into your general planting scheme. They fit admirably into the perennial border and can be naturalized in front of shrubbery, or in odd corners of the yard where the grass does not need close clipping. Annuals may be planted in between the bulbs to take their place after the foliage has ripened and been cut away. Make sure that the leaves are really ripe before removing them, for it is through the leaves that the bulb stores up its food for another year of blooming. A safe rule is to wait until the foliage turns yellow.

With bulbs your color scheme can be made to fit your fancy. Even mixtures can be attractive, thanks to such as the Breeder tulips, which have pastel shades. However, in general, you will find more satisfaction in the color effects you achieve with the named varieties. Then you can plan your borders as you want them. A mass of yellow, cream or white narcissus bordered with heavenly-blue grape hyacinths makes a striking combination. Or you can plant purple, gold and coral hyacinths in front of tall yellow daffodils. For early blooming, of course, you will want crocuses in gold and white and purple, preferably in a sunny spot near the front door, or where you can see them from the house as they brighten a sunny bank or border. For later blooming choose lilies; the hardier ones such as Tigers, Madonnas, Umbellatum, Regals, and our lovely native lilies *L. canadense* and Turks-cap (*L. superbum*). These are effective planted in informal groups to accent the perennial border, or at the back of lower plantings. But a second warning is in order here—do not buy cheap, diseased lily bulbs. Also avoid the lovely but fussier ones, such as the Gold-banded lily, until you have learned something about growing them. Lilies like a rich loam that is perfectly drained, and they dislike being crowded. Plant them six to ten inches deep according to variety. Lilies also propagate themselves and will need divid- (Continued on Page 388)

9 P.M., August 1; 8 P.M., August 15.



9 P.M., Sept. 1; 8 P.M., Sept. 15; 7 P.M., Sept 30.

To use these maps hold them before you in a vertical position and turn until the direction of the compass that you wish to face is at the bottom. Then, below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south. Time given is Standard Time; add one hour for War Time.

August and September Skies

By ISABEL M. LEWIS

IN THIS two-month period there will be several interesting conjunctions among the planets—Mercury with Venus and with Jupiter; Venus with Jupiter and Mars, as well as with Mercury.

Mercury will be in the evening sky until it comes into inferior conjunction with the sun on September 6, when it passes to the morning sky. It will be farthest east of the sun in the evening sky on August 10, and farthest west of the sun in the morning sky on September 22. The evening elongation will not be a favorable one. The planet will be then farther away from the sun—27½ degrees—than at any time during the year, but its path cuts the horizon at such a small angle at this time that Mercury will be only 9 degrees above the horizon at sunset and difficult to observe in the haze of the evening twilight. Its morning elongation on September 22 will be much more favorable, however, for it will rise then more than one and a half hours before the sun and will be 16 degrees above the horizon at sunrise. On the following day there will be a close conjunction of Mercury with Jupiter. At that time Mercury will be more brilliant than Vega or Arcturus, and Jupiter more than twice as brilliant as Mercury. At the time of conjunction the two planets will be so close that they will resemble a double star. Shortly before sunrise on September 23, although not as near as at the time of conjunction, they will still be a close and brilliant pair in the morning sky. This will probably be the most favorable opportunity of the year to identify and observe this elusive planet.

The conjunction of Mercury with Venus on August 26 will be difficult to observe. Venus is low in the west and not well placed for observation in August. Its superior brilliance may make it observable, even in the glare of twilight, close as it will be to the horizon. It will be more difficult to find Mercury although Venus will be an aid as the two planets must be close together at the time. This is not a close conjunction of the two planets since Mercury will be at the time 6 degrees south of Venus. On September 9 there will be a conjunction of Mercury with Jupiter, but the two planets are at the time so close to the sun that neither of them is visible.

The position of Venus in the evening sky will gradually improve during these two months. The planet is now in the gibbous phase as seen in the telescope, and is still on the far side of its orbit from the earth. It will set within about one hour of the sun in September. On September 9 there will be a conjunction of

Venus and Mars, difficult to observe because both planets will not be not far above the western horizon. Mars is now far from the earth and gradually drawing in toward conjunction with the sun. It will not be easy to find it in the twilight, even with the aid of Venus, which will be about half a degree north of it at the time of conjunction. Mars is now less brilliant than a star of second magnitude. About the middle of September Mars and Venus will be only a few degrees northwest of Spica in Virgo.

Jupiter passes from the evening to the morning sky on August 31, when it is in conjunction with the sun. It will, therefore, be seen low in the West in the early part of August after sunset, and low in the East before sunrise in the latter part of September. At the end of that month it will rise about one and a half hours before the sun in Leo.

Saturn will be in Gemini during these two months. In August it rises several hours before the sun and is high in the eastern sky at sunrise. By the end of September it rises shortly before midnight and is near the meridian at sunrise.

The Perseids, one of the annual showers of meteors, give a maximum display on August 11-12 after midnight, although they may be seen in smaller number on any night in the earlier part of the month. They will have some interference from moonlight this year. This should not be strong enough to blot them out altogether, however. The moon will be at the last quarter on August 10, rising about midnight, and the constellation of Perseus—in which the radiant of the shower lies—may also be seen in the northeast about the same time. Bright moonlight reduces greatly the number of meteors observable. The Perseids are swift and bluish-white in color, and come from the general direction of the constellation whose name they bear. Thus one will easily recognize a member of the swarm.

The Milky Way is particularly interesting at this time of year, when its sharp division into two branches is very noticeable in the evening sky. This apparent division is due to the presence of dark nebulous matter lying along the Milky Way in this part of its path and not to a real cleft in it, as was formerly believed. In the constellations of Scorpio and Sagittarius are some of the densest clouds of the Milky Way, and among them many wisps and patches of dark nebulosity. The center of our great galactic system lies in Sagittarius. Our solar system is estimated to be at a distance of 32,000 light years from this center, and the period of revolution around it is about 225,000,000 years. It follows from this that the mass of our Galaxy, or Milky Way system of stars, is 170,000,000,000 times the mass of the sun. The Galaxy is flattened, or lens-shaped, with a diameter of 100,000 light years and a thickness of 10,000 light years. Scattered above and below the Galaxy, to a distance of about 50,000 light years from the central plane, are the globular star clusters and many individual variable and non-variable stars.

Many great galaxies, similar in general to our own galaxy, lie at distances measured in millions of light years from our own galactic system. They are the well-known spiral nebulae or "island universes." One of the nearest of these and one visible to the naked eye is the Great Andromeda Nebula. Its distance from the earth is about 900,000 light years. The Large and Small Magellanic Clouds are the nearest of the external galaxies. The Large Cloud is at a distance of 75,000 light years, and is 12,000 light years in diameter. The Small Cloud is at a distance of 85,000 light years, and is only 6000 light years in diameter. They have the appearance of detached portions of the Milky Way, from which they are far distant, in southern circumpolar regions. The Large Cloud, Nubecula Major, as it is also called, is in the constellation of Dorado, The Goldfish, and the Small Cloud, Nubecula Minor, is in the constellation of Tucana, The Toucan. It has been estimated by Shapley that there are half a million stars brighter than the eighteenth magnitude in the Small Cloud. Neither of these galaxies can be seen north of about 20 degrees north.

Autumn will begin this year in the Northern Hemisphere, and spring in the Southern Hemisphere, on September 22 at 11:02 P.M., Eastern Standard Time, when the sun will cross the Equator going south.

★

Of Sun and Stars

By LANSING CHRISTMAN

We have seen the dawn come,
Soft and tender and pink,
Lovely as the sweet pea blooms
I find in my garden now.
We have seen the evening come,
Golden and rich and pure
As the yellow primrose that opens
Near my doorstep before the deep
Cool darkness closes in.
We have come to know them both,
To be a part of them,
And both help make us glad
That the days give sun,
That the nights yield stars.

Hawaiian Birds

Birds of Hawaii. By George C. Munro. Honolulu. 1944. Tongg Publishing Company. 189 pages. Illustrated with color plates by Y. Oda, and with black and white photographs.

No complete work on the native and imported birds of Hawaii has been published since 1903, so the author has laid aside a manuscript on the history of the indigenous birds of the Hawaiian Islands to produce this popular guide, War has brought a great influx of population to the Islands, including many interested in bird life. Hence a demand for a bird book, and this one seems to be a quite adequate response to the demand. By and large the user of the book will have to learn to identify the birds by either their Latin or Hawaiian names, since many of them have no English popular names. Mr. Munro provides brief descriptions to aid in identification, and supplements these with other facts about the birds, including their present status as to numbers and distribution. There are twenty plates in color, picturing 130 species, plus contrasting pictures of male and female plumage of many of these. Although there are signs that the author hurried this book to publication, and although war conditions impose limitations upon paper and printing, this guide should serve a valuable purpose and should be much appreciated by Hawaiian bird lovers and those who the fates of war have taken to the Islands.

Story of a Home

Home in the Woods. By Hattie Lumbard Kofod. Rochester, N. Y. 1944. Published by the Author at Empire Boulevard, Rochester 9, N. Y. Illustrated. 122 pages. $1.75.

City life gave the Kofods a sense of frustration and incompleteness. So, pioneering, and in the face of some misgivings, they moved to an abandoned house near a wooded glen, taking their two children with them. There they found what they sought—a completer life; a wealth of Nature; the treasures of a sounder family existence. Mrs. Kofod tells the story of this venture, and the rich dividends in satisfaction that it has paid, in this little book. Its charm lies in the direct and enthusiastic way she has described their pioneering; their doubts as to whether they could manage with the primitive character of their new abode; the joy with which they discovered new charms in their surroundings. They have, of course, established a sanctuary; played host to bird and mammal; created a wild flower preserve; made of their home an educational center for those who love and appreciate Nature. Besides the desire to go and do likewise that Mrs. Kofod's story provides, the greatest enjoyment in reading her book lies in the fact that you feel yourself as a part of the family in the process of reading.

Men of Science

American Men of Science. Edited by Jaques Cattell. Lancaster, Pa. 1944. The Science Press. Seventh Edition. 2033 pages. $9.00.

First published in 1906, this invaluable biographical directory of men—and women—of science now appears in its seventh edition. While the first edition contained four thousand biographical sketches, this latest edition includes thirty-four thousand. Great credit goes to Dr. Cattell, and those who have assisted him in preparing this edition, for bringing it to a successful conclusion during time of war. The third edition was in course of preparation when war was declared in 1914, and was postponed to be resumed in 1916, and again was postponed when the United States entered World War I. Thus it appeared in 1921, and subsequent editions have been brought out at approximately five-year intervals. This volume is, of course, an essential for any properly-supplied public library, and for any scientific library. Its present size and content testify graphically to the importance of the army of American scientists who, today, are making such signal contribution to the fight of free peoples for the freedoms they enjoy, including a free Science.

Mapping

Down to Earth. By David Greenhood. New York. 1944. Holiday House. 262 pages. Illustrated. $4.00.

Maps fascinate many people, including ourselves, yet among the many map enthusiasts it is likely that the majority have little more than a superficial knowledge of maps and mapping. There are many kinds of maps and many details that go into map making that are fascinating. There are Mercator maps and conical maps, isographic maps and gnomonic maps; topographic maps and orthographic maps. Now, at last, David Greenhood has come forward with a book on maps for the layman. He has written a book to be read; a book that will aid the map enthusiasts in the use, collection or making of maps. This is an extremely interesting and valuable volume with the subtitle "Mapping for Everybody," which, indeed, it is.

North Carolina Trees

Common Forest Trees of North Carolina. By J. S. Holmes. Raleigh, N. C. 1944. North Carolina Department of Conservation and Development. 87 pages. Illustrated. $.10.

This is a handy pocket manual first published in 1922 and designed to aid the user to a knowledge of the forest trees of the State. The present edition is the fifth, and to it have been added four additional tree descriptions, as well as lists of less important trees that have been introduced and have gone wild.

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The School Page

Edited by E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

From A to Z

By MARY B. KILCAWLEY

It was a quiet June afternoon that Sandra came to me under the oak tree with the distressing story that ants were eating the body of a beautiful moth that was lying on the sidewalk near her home. Later, she brought it to me and I put it on a table on my back porch so that the children of the neighborhood could see it. From this lovely lifeless object came the inspiration for a living project—a laboratory.

One of the first specimens brought to this laboratory was a small brown butterfly. Sally and Sandra rushed breathless to the porch with it in a glass jar. In an incredibly short time, a group of young would-be scientists arrived—Jimmy, Jack, Tom, Isabel, Florence (Flick). Books were brought out, and the hunt was on for the name of the butterfly. The books and glass jar changed hands whenever one thought that she or he had found the right picture. Finally, Jimmy snapped a mental picture of the lozenges on the under wings and carried this to the book. In a few seconds he found similar lozenges on the under wings of a butterfly labeled "silver-spotted skipper."

The next morning, Jimmy brought another one that looked somewhat like the skipper. It took only a few minutes to find the name of this one. All agreed that it was a "silver-bordered fritillary." For days, Tom and Flick, each four years old, had great fun singing the names of these two butterflies as they set out in search of them.

As soon as these children learned that caterpillars developed into either butterflies or moths, they were anxious to find a great many different kinds. In this way, they hoped to have butterflies and moths that they could call their own. Their first and only complete success during the summer was a cabbage butterfly. A little green "worm" ate all of the leaves of a spider plant before it was placed in a glass jar. The night after it was put in the jar, it fastened itself to the bottom with a few fine threads. At various times during the next day I heard the children counting. They were checking the number of times that the green "worm" jerked its body from side to side while someone was counting to ten. At first it was seven, later five and, finally, it lay still encased in its pale yellow chrysalis. Some time later they put two puddle butterflies in the same jar. One afternoon, when Sandra picked up the bottle to show these to her grandmother, she called, "Who put the new one in?" In another instant, she uttered a stifled cry, "It's the green worm—the chrysalis is empty." From that time until late into the evening, feet hurried to and from the laboratory. After everyone had seen the miracle—a green "worm" that became a yellow butterfly in eleven days—it was taken to a neighbor's cyanide bottle. This cabbage butterfly and its chrysalis became the nucleus of their first collection.

When Jack's lavender caterpillar, which had a yellow head and a red tail that stood straight up on its back with a tiny curl at the end, changed to green and then to a rich, velvety brown, they were sure that their next treasure would be a hawk moth. From the day of its discovery, it was the one great curiosity of the laboratory. Its tail—which was not a tail but a caudal horn—eventually disappeared, and at that spot a glossy eye stared up at them—but it was not an eye, either. At first, when he was disturbed, he put on the regular caterpillar stunt. Down would go his props, and up would go his feet and the fore part of his body. As he puffed out, he would fold his little feet squirrel-like and pose thus. After a while, however, he permitted them to stroke his soft skin lightly and seemed to like it, for his whole body would relax. His death was a tragedy. As Sandra looked at his body drying in the sun, she said mournfully, "After all our work, you up and died." A few days later, Jimmy, "filled with remorse, came and told us that Dan Beard said in his book that the velvet worm had to go down into the ground to make its chrysalis." "Why didn't I read that book last week?" sighed Jimmy.

The velvet "worm" was not the only one that required much care. The skeleton of a milkweed plant led to the discovery of dozens of milkweed moth caterpillars. These were brought to the laboratory and put into jars. By the middle of August there was not a milkweed leaf to be found in the immediate neighborhood. However, the children felt that they were well paid for their work of feeding the caterpillars and keeping the jars clean because, whenever they took them out for their sunbaths, they had fun watching them. As the caterpillars walked, they swung their feathery heads from side to side as if they were graciously bowing as they passed by; and they always dusted their paths behind them with their "fuzzy" little brooms. The boys thought of sending some of them to Walt Disney.

The greatest dramatist of them all was the black-and-yellow-ringed caterpillar of the swallowtail butterfly. A child would hold up a carrot stem with one of these beautiful creatures clinging to it and shout, "Strut your stuff, Stripey. Who's afraid of your carrot horns?" Then someone would touch it lightly and out of the back of its head would pop two pink horns. To their annoyance, they had one that refused to obey their orders after its second performance. The one they loved best tied two silk threads around the middle of its body one night and hung itself up on the side of the bottle. Then, in a few days, it changed from a black and yellow caterpillar to a cute little dog. When Sandra first looked at this little gray dog, she exclaimed, "Oh, we are going to have a dog-faced butterfly."

The Slukey twins, and their young brother, Butch, do not live in the immediate neighborhood, but they often came to the laboratory with treasures. One of these was a little transparent caterpillar that they found walking up their pantry door. After some discussion, the group decided that it must have come into the pantry on vegetables from their Victory Garden. It looked red inside, but it was not until they saw it eating a beet leaf that they knew the reason why. The prize, however, was a tiny little caterpillar with small black squares on its back. When it stretched itself and started to walk, Butch said, "There goes a train of cars." Isabel called it the fairy's train of cars. Unfortunately, a few days later, Butch happened to be present when someone, accidentally, set a jar down on it. He cried bitterly, "There, now, you wrecked the train of cars." A few seconds later, he looked up at me beseechingly and said, "I would like to study Nature."

The study of these creatures naturally led to the study of plant life in the neighborhood. This was done indirectly, however. The caterpillars had to have food. The children soon learned that each one had a particular plant that it preferred. Therefore they had to learn the names of these, what they looked like and where they grew. The ravenous appetites between moultings, and the great numbers, demonstrated to the children how destructive these small creatures really are. They saw the velvet worm eat entire leaves and stems of plants, while others ate only the more tender parts of leaves. In their victory gardens, they found particular pests for practically every vegetable, including tomato, potato, cabbage, broccoli, carrot, beet, bean and corn.

Tom and Flick often answered the call for such plants as milkweed, plantain, clover, wild carrot, or fern. Frequently, when the older ones would be in a huddle over some puzzling question, these two little ones would (Continued on next page)

wander about by themselves; tilt the umbrella leaf of the wild ginger and take a brown cup; visit Jack in the pulpit, life up his cap and say, "hello"; watch the aphids do a snake dance up the delphinium stalk; try to catch the "jeeps" as they hopped gingerly from marigold to zinnia. They would chase the flitting butterfly but Flick would always duck the darting darning needle. Seeing her do this one day, I asked her where the dragonfly went. She scanned the flowerbed carefully from a distance and called in a hushed voice, "He is sitting gently on the zinnia."

Boys from the day camp at the Y.M.C.A. dropped in a couple of times when they were in this section on field trips. The children felt quite important on these occasions. Tom lost his natural shyness on one of these visits and told them about the silver-spotted skipper and the silver-bordered fritillary in a quite matter-of-fact way. Suddenly, remembering the dramatic performance of a few days previous, he told them the story of the green "worm" that turned into a yellow butterfly in eleven days—right in our laboratory. Sandra, only seven years old, gave an interesting talk on the specimen in their collection. She pointed out the cicadas, katydid, sand wasp, puddle butterflies, monarch, viceroy, red-spotted purple, swallow tails, horse fly and others with special emphasis on the cabbage butterfly and its chrysalis. She had recently read the story of the cicada by Fabre. While telling this story briefly, she stressed the facts that it lived in the ground for four years and only could live in the sunshine about five weeks. Many of these boys from camp were older than our children, who were all under the age of twelve. They were particularly fascinated with the work that the caterpillar of the wood nymph had done. It had sealed itself inside of a twig so neatly that they were not able to find where it entered.

As summer passed, the number of birds, butterflies and moths increased. Often the fluttering butterfly seemed to challenge the boys, for they would hurry out of their "foxhole" and forget their war games for the time being. They would return shortly to the laboratory with the butterfly. Then another hunt would be on if they did not know the name of the specimen. This was very important, for unless they knew its name they had to let it go. Occasionally, it took a great deal of patience to be sure of their identification. For example, it took the greater part of one forenoon to identify the red-spotted purple, for there was only one picture of it in the books and that was a poor one. With butterfly books and magnifying glass, they went through a process of elimination until they were quite sure that they had the right name. A short time later, when they were studying the white banded member of this family, they discovered that the butterflies they had called "small monarchs" were, in fact, viceroys. As I listened to their remarks, while they were comparing the wings of the viceroy with those of the monarch, I remembered the expressions on their faces the morning that they were studying the red-spotted purple; and I thought of these lines written by Alfred Noyes:

"He only saw
The blaze of color, the flash that lured the eye;
He did not see the exquisite pattern there,"

I knew that these boys and girls did see the exquisite pattern there—

"Inlaid with intricate harmonies of design;
. . . . . .
All ordered in an intellectual scheme,"

The children were sad, indeed, when they came for their last visit the day before school opened. They agreed, however, that the laboratory and museum should be opened in the early spring; and that everything that happened another year should be recorded carefully. Although the "lab" closed officially on the day that the schools opened, the children continued to pay visits to the back porch. Sandra, Sally, Twinkle, Susie, Peggy and their friends dropped in occasionally with their pockets bulging with gaily-colored leaves and their lunch boxes lined with caterpillars.

There was a lively reunion in late September when the call went out that there were three bats in the museum. Another call went out on Hallowe'en. An injured walking stick alighted on a screen door at the home of five of our young scientists. Although one leg was missing, it could walk. Thus the children could see just how rapidly it could get about even if it seemed only to lumber.

One Saturday afternoon, I saw a huge box coming end over end up the street. I learned later that it is to be the "bugs" house next summer. The boys explained their plan this way: "Dirt in the bottom for trees and plants . . . screen in front . . . small door in back. See? Simple!" As my back door slammed shut, I thought, "Simple. . . . Yes, the whole plan was very simple. The work was spontaneous, interesting, lively; no restrictions; no restraint; books but no book learning." Then I realized that these children had spent a happy vacation for they had been free.

During Christmas vacation (on their own initiative), they prepared individual sets of examination papers. They came individually during the month of January for their tests. Washington's birthday was chosen as graduation day. Diplomas were prepared and seals made. They proved on graduation day that their work covered everything from A to Z—APHIDS to ZINNIAS.

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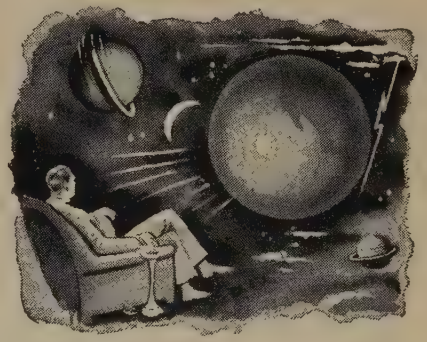

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SAN JOSE (AMORC) CALIFORNIA

THE NATURAL HISTORY OF CATTLE BRANDS

(Continued from Page 348)

they chose X I T for even to a Chicago financier it read "Ten in Texas."

Brands on cowhide at an angle between the vertical and horizontal were "tumbling" to the tally man. When he called "Tumbling T" or "Tumble Bug," everyone within hearing knew he had seen an overbalanced T or TB. Letters or numbers in a horizontal position were lazy, like the "Lazy Deuce" or the "Lazy D." To an easterner all brands may seem a little queer, but to a cowman only those burned upside down, or backward, or both, were actually crazy, such as the "Crazy 3."

There are cattle roaming western ranges today carrying a simple % or $ brand. An inquiry of the owner might reveal that he was suffering from banker's blight or held an optimistic view of the future; most of the time it would be both. With all the hazards that beset their ventures, ranchers were by nature gamblers and thousands of steers changed owners over the table. When Ellen Carter won a few yearlings from her husband in a friendly game of seven-up she promptly registered a brand consisting of a 7 and a P on the arms of a U and had it stamped on her winnings. There are large herds ranging North Texas today bearing 6666, and "Four Sixes" are reputed to be the cards that won their grandparents.

It was the constant hope of every rancher that sporadic .45-caliber heat waves would carry off all rustlers near his range, but a few always survived summer temperatures by fanning a fast horse. A clever rustler was a real menace but casual operators were not much of a problem. The owner of the "I C" brand was not bothered much when he came on one of his steers marked I C U. He knew the "I C U" outfit was just a little eager with the iron. He registered "I C U 2" as a second brand, and thereafter the annual stock tally was about what might be expected, considering summer droughts and winter blizzards.

The men who knew the bite of winter winds, men who cooled their horses in the shade of rustling cottonwoods, never lacked ingenuity when it came to designing brands. When they set their mind to it they frequently made history. The "Barber" brand of Jack Barber; the "Katiebar" of Mrs. Katie Barr; the "Key" of the Key family were good. "Bob on the Square" and "Coon on a Rail" were even better. Even the oddest of the lot could never stump an old cowhand and when he saw a couple of misplaced parentheses on cowhide he did not hesitate. "Quien Sabe ?" (Who knows ?) he said. And so that brand was known thereafter, for the name was as good as any and it stuck.

AN AVIAN CRÈCHE

(Continued from Page 351)

thrush gave the evening call. The work of my birds and their human assistant was about over. They could now "wean" the youngsters themselves. So all were moved back into the aviary.

There they found shrubs and branches to climb. A thirty-foot flight was possible. Baths could be taken in the big water pan—a new delight. Food cups and seed trays abounded, and the nestling diet lost its former attractiveness. Babyhood lingered with some, but when the youngsters were all about five weeks old they were on their own. Vee and Bonnie had finished their task of foster parenthood. And so had I.

G.I. CHIMP

(Continued from Page 377)

ing off badly burned fingers and toes. Later he met with another accident so we had to chloroform him. Ten minutes after the army doctors pronounced him dead, the chimp got up and walked around.

Next to the chimp, the most likable pet here is the dog. Somehow, most people think the canine is too tame to be a true African product. This misconception owes its origin to fiction writers or publicity-seeking professional travelers who color with terror their experiences in the jungles. There are more dogs in Africa than tigers, lions and elephants combined.

We are attached to "Recon"—a female mongrel so named because GI's picked her up while on a reconnaissance trip in the African interior. Nobody knows Recon's pedigree, but she is a typical bush mongrel, raised by aborigines. Probably she never saw a white man until the Yanks came here. Recon has learned to do some remarkable things. Her morale-building antics include knocking her bosom jungle pal, Billy-O, the chimp, for a loop. She can lie on her back, let the chimp get his first hold and still throw the hairy beast two out of three falls. As smart as she is, Recon has not yet learned to break the chimp's vise-like grip on her jaws. She does know the effectiveness of kicking the primate below the belt, and speaking for GI chocolate rations. Instinctively, she is a nemesis to mambas, bush cats and small deer.

From first-hand observations, soldiers admit that the dog is smarter than the chimp; but there is some doubt as to which has the keenest smell. The chimp's pancake nose is kept moist like a dog's, and appears to be sensitive to slight currents of air. No doubt both can trace odors of all known sorts that elude us. Like all dogs, Recon can track a soldier by earth odor in the compression in the foot print; the chimp can do this to some extent. He seems better adapted to trailing a GI by smelling the plant odor from crushed vegetation, and can even be guided by the shoe polish the soldier uses. Recon is better equipped to smell body odors than is the chimp.

Next to mail, animals are the greatest morale boosters most soldiers stationed in African jungles have. It is a safe bet that most of these soldiers will continue their interest in pets long after the war is won.

NEW TREES FOR OUR FORESTS

(Continued from Page 354)

native poplars for paper pulp, and there are indications that, for certain chemical uses, the wood of hybrid poplars may be somewhat better.

"Aside from the value of poplar hybrids as rapid wood producers," Dr. Schreiner said, "they serve, in a sense, as guinea pigs. What is learned of inheritance from these trees will be guideposts along the way to improving slower-growing forest trees."

Second generation hybrids are even more interesting than first generation hybrids. In contrast to first generation hybrids, which are ordinarily quite uniform and exceptionally vigorous, their progeny usually show a wide diversity of types, often including greater variations in disease resistance.

Although Dr. Schreiner's work has been curtailed for the duration, pedigreed stock obtained from his breeding experiments is being carefully saved. Part of it is growing on the Forest Service area at the Beltsville, Maryland, research center of the Department of Agriculture, and the remainder is at the Morris Arboretum, Philadelphia, where the Allegheny Forest Experiment Station of the Forest Service cooperates with the University of Pennsylvania in forestry research.

Dr. Schreiner foresees a heavy demand for rapid-growing hybrids in the future, what with a large postwar planting program and the new uses being made of veneers and chemical woods, particularly for plastics.

"Not long ago it would have been considered next to impossible to grow trees faster than Nature grows them; yet anyone familiar with what the breeder of agricultural crops has done for the farmer, can visualize the day when hybrid trees may be as common as hybrid corn," Dr. Schreiner predicted.

One thing is certain: the supply of lumber is dwindling fast, and something must be done about it. Faster growing trees will help solve the problem, although, of course, conservation, reforestation and fire protection must be the major factors in meeting our problems of forest resources.

Wild Vitamins

If any one thing has been overdone in recent months it is the vitamin business, which purports to put out the answer to health and vitality in capsule and pill form. A proper diet, such as most Americans can easily have today, will supply the needed vitamins. Nor are these essentials to health confined to the cultivated fruits and vegetables. Agricultural experiment stations have been studying the vitamin qualities of wild plants. They have found the buffaloberry even richer in Vitamin C than the citrus fruits. New Hampshire-grown wild blueberries, eaten raw, also contain a good supply of the same vitamin. Mangoes rank with canned tomato juice in their vitamin content, and peanuts are recommended for thiamine as well as their protein value. Wild rice contains several B vitamins, as do the common field mushrooms.

Many Interests

Peter Kreiter of 175 Spring Street, Hillsdale, Michigan, is a scientifically-minded young man, interested in biology, chemistry, geology, astronomy and related fields. He would like to correspond with others in various parts of the country interested in one or more of these fields.

Defend Lacy Act

Opposition to amendment of the Lacey Antiquities Act is voiced by the Board of Trustees of the Southern California Academy of Sciences, in a resolution declaring that the Act in its present form is in the best interests of the American public. The stand is taken against the proposed bills (S. 1046, H.R. 3864, H.R. 3884) that would abolish the power of the President of the United States to establish national monuments by proclamation, and against a bill (H.R. 2591—S. 1056) requiring approval of State Legislatures before such proclamations could become effective.

Animal Day

In 1928 the World League against Vivisection and for Protection of Animals, with headquarters in London, inaugurated observance of World Day for Animals. This day is October 4 and is dedicated to St. Francis of Assisi. In peace and war the observance has been carried on throughout the world through organizations of animal lovers. Education is its chief object, and much educational literature is distributed by cooperating groups and individuals. The headquarters of the League are 42, Aberdeen Road, London, N. 5., England, an emergency address, due, we suppose, to German bombs. E. Clifford Pratt, 5863 Cote des Neiges Road, Montreal, Quebec, Canada, is an active worker on this side of the ocean.

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GARTER SNAKES ARE FRIENDLY

(Continued from Page 360)

size of mice. It is not a serpent that harms any human, and is a thousand times more afraid of man than he should be of this lowly creature. It is a sociable dweller of our gardens, dooryards and fields. It asks only to be left alone to lead its life as it pleases. It likes nothing better than to bask at times on a shrub, frequently choosing a blackberry bush, and how it misses the briars we do not know.

I recall a mid-June day when I witnessed peculiar actions on the part of a two-foot-long garter snake. The serpent crawled out of some fairly high undergrowth to a recently-mowed lawn. Finding itself on the closely-cropped grass instead of in a wilderness of thicker, higher growth, it seemed dazed and utterly bewildered. It reared up in the air, as a blacksnake will when it stands on its tail. It surveyed the surroundings in a way I had never seen before. I walked up to the serpent but it made no effort to escape, seeming like a creature in a dream. When picked up, it continued quiet, at no time trying to free itself as most serpents would do in fright. Not until I carried it to the high undergrowth from which it had first emerged did it seem to regain its senses. Then it quickly glided away to thicker cover.

There is perhaps no method by which we poor humans can fathom the acts of such a humble creature. Nevertheless, this experience served only to deepen my interest in the serpent tribe that, among all the reptiles of America, most deserves our kindly regard and the chance to perform that part in the world of Nature for which it came into existence.

MADSTONE "MIRACLES"

(Continued from Page 355)

the stone was not included. The mother consented, and before leaving the camp she explained the use of the stone. He took it back to his own country and left it to his heirs.

Quoting from an old record, one Hector Maclean, Esq., of Scotland described this curious stone:

"The Lee Penny (so named from Lee, the country place of Sir Simon) has had and still has (1832) its votaries who believe in its efficacy to cure all diseases to which man and beast are subject, particularly in cases of hydrophobia. . . . It is a stone of dark red color and triangular in shape, and its size about half an inch each side. It is set in a piece of silver coin now almost entirely defaced, but from some letters still remaining, supposed to be a shilling of Edward I., the cross, a few years ago, having been very plain as on that shilling. . . . It is used by dipping the stone in water, which is given to diseased cattle to drink, or the person who has been bit. The wound or part infected is washed with the water, and by drinking the water in which the stone is dipt, the patient is restored to health."

The stone was used extensively in England and Scotland, and the peculiar powers imputed to it did not seem to deteriorate with its use. It is recorded that: "The inhabitants of Newcastle, when infected with the plague, sent for the Lee Penny, and granted a bond for a large sum for its safe return; and such was their faith in it that they offered to pay the sum and keep the stone."

One of the many cases of cures cited was that of a Lady Baird, near Edinburgh. She was bitten by a mad dog and symptoms of hydrophobia appeared. Her family sent for the Lee Penny. She used it for some weeks, both drinking and bathing in the water in which it was dipped. Her recovery was attributed to its use, and in token of her gratitude she entertained Sir Simon, the Laird of Lee, and his wife many days "in the most sumptuous manner."

One remarkable part of the history of the stone was that it was not condemned when the Church of Scotland impeached many cures that savored of sorcery. But in the annals of their church they "excepted the amulet called the Lee penny to which it had pleased God to annex healing virtues, and which the Church does not presume to condemn."

No one today would be so foolish as to stake life upon any of these "healing" stones, but it is interesting to know something about them, if only to accent the contrast in knowledge of yesterday and today.

WASP WATCHING

(Continued from Page 376)

in color what human eye had never seen before.

After a short rest the industrious mother goes hunting, first for three to five light-green caterpillars, then several short fat brown ones, which are pushed by might and main into a compact mass. All is now ready to be sealed in with a new partition of mud.

To secure the mud *Odynerus* selects perfectly dry dirt that happens to suit her fancy, often returning to the same spot for successive loads. The dirt is wet with water from the crop, which adds secretions to render the mud partitions more or less waterproof. About every fourth or fifth load the wasp must fly away to get a drink of water for further batches of the mortar. Jaws and front legs serve as pick, shovel and trowel, and the lively antennae seem the chief sense organs to direct each act, like a pair of hands armed with rule and square.

In two days the egg hatches and gingerly the delicate grub lowers itself to get a taste of caterpillar blood, its first meal. It grows apace and at the end of two weeks has consumed the edible portions of the prey and is ready to spin its cocoon. All this is seen in the glass tube, which we have taken home and placed in a container for observation as opportunity permits. If the weather remains hot the adult may emerge to grace our insect box as a specimen for identification by the specialist, or she may take her place in Nature and carry on, with unlearned but perfect skill, after the manner of her kind. But if autumn frosts intervene, the mother dies, and the offspring remain dormant in the nest until the warmth of late spring returns again.

"BOMBS OF BEAUTY"

(Continued from Page 380)

ing after a few years. Some of the stem rooters, such as Umbellatum, multiply quite rapidly. This is the low-growing, deep-orange variety, which blooms in late spring. Its strong, rich color and sturdy habits make it a prize for any garden. The lily family is large and choice but they are not always the easiest of plants to grow.

Many of the bulbous irises are charming and fairly hardy. The bearded and fibrous-rooted irises do not rate as bulbs but are worth adding to any planting list. Day-lilies are not bulbs either, but they are one of the most satisfactory of all hardy plants because they are so hardy and easy to grow. The range of colors has been greatly extended in recent years from pale yellow to red, and the season has been lengthened by careful plant breeding.

But do not limit your choice to the varieties and sorts I have listed here. Get some catalogs and garden books in color and spend an hour or so browsing. You will be amazed at the wide range of colors, forms and varieties. There are literally thousands of named sorts in the narcissus tribe alone. Pick out a few good ones every year for a dozen years, give them good care, and you will find yourself with a real store of buried treasure, treasure that will give you yearly dividends in beauty from March until mid-autumn.

Collected Poems

"Toward Tunis." By Maud Ludington Cain. Marshalltown, Iowa. 1944. Published by the Author. Fifty Cents.

These are not Nature poems, but their author has been a frequent contributor of poetry to the pages of *Nature Magazine,* and this little collection of poems is of the same high standard set by those of her poems we have been privileged to publish. Mrs. Cain sent us an autographed copy, which we enjoyed so much that we must here record its publication.

R. W. W.

Successful Living

Invitation to Health. By Dr. Harry J. Johnson. New York. 1944. Prentice-Hall. 249 pages. $2.75.

The author of this book is the medical director of the Life Extension Institute and Examiners, and, in this capacity, he has had an excellent opportunity to form a cross-section opinion of the problems of successful living that confront the American people. Against this background he has written a popular book that espouses no fads, sounds no terrible alarms and does not seek to make diagnoses. In other words, it is no "scare" book calculated to make a lot of hypochondriacs, but a popular and sensible discussion of the common sense of successful living. It is to be hoped that the invitation offered by Dr. Johnson in his title, and in his book itself, will be accepted by many.

South Pacific Mammals

Conspicuous Mammals of the South Pacific. By Ken Stott, Jr. San Diego, California. 1944. Zoological Society of San Diego. 40 pages. Illustrated.

Dealing, necessarily briefly, with the more unique animals of the South Pacific islands, this bulletin of the Zoological Society of San Diego is most timely when so many eyes are turned to events in the Pacific. The treatment of the subject matter is popular and "strives to indicate the types of fur-bearing animals one may hope to find there and typical examples of each group."

Malaria Control

Practical Malaria Control. By Dr. Carl E. M. Gunther. New York. 1944. The Philosophical Library. 91 pages. $2.50.

This is a handbook for field workers in controlling malaria, and is written by a man who served many years as medical officer of a large industry in malaria-ridden New Guinea. He now is in the Australian Medical Corps. He is an entomologist and student of clinical and preventive work in this field, and writes against a background of practical experience. The book includes discussion of anti-malaria measures, diagnosis, treatment and complications of the infection.

Aid for Soldiers

The news letter of the American Nature Study Society reports need for natural history texts at the various rehabilitation hospitals where soldiers are recuperating. It is urged that Nature magazines and Nature books be sent to the nearest of these hospitals, and that volunteers living near such hospitals offer their services to give Nature talks, show pictures and conduct Nature walks for the men able to take them.

A Tree for to See

With the usual anonymity to which an editorial writer on a newspaper is consigned, one of the members of the staff of *The New York Times* wrote an editorial to which he gave the title "A Tall Tree." It carries thoughts so worthy of reading, and re-reading, that we print it here with a bow to its ghostly author:

"Every garden should have a tree near by. A tall tree with broad bole and spreading branches, preferably with branches that start well down the trunk or with a low crotch from which a boy might climb. A tree which spreads its roots where it springs from the earth, firm-based and strong against the storms.

"This is a tree for man as well as boy, the man who has climbed his trees and now can sit beneath them in understanding. For him those branches offer shade and hospitality when the sun has seared his neck and the garden is only half weeded. He can rest his back against that broad bole in spring, when the spading is half done. Weeding and spading that younger hands once hastened through.

"There is reassurance at the foot of such a tree, as well as rest. The years have added to its strength and stature. The wind, the rain, the ice and the blistering sun have all gone into the toughness of its fiber. Its roots strike deep into the soil and find sustenance in the old, old hills.

"Youngsters must climb trees, to look out across a world that is misty with adventure. New horizons can be seen from tall trees when one is young. But the time comes when one can sit at the foot of such a tree and see even farther than the eye could reach from its highest branch. There are times when one can see all the way to Tarawa and Anzio and Guadalcanal and Cassino."

BB Guns

From the offices of the Pennsylvania Game Commission comes a warning to parents that they should see to it that youngsters do not shoot at song birds with BB guns and other air rifles. Use of such arms to kill any bird or mammal is unlawful. Stringent regulations protect song and insectivorous birds. Killing or wounding robins, bluebirds, catbirds, woodpeckers or others of the protected species, is a Federal offense involving a maximum sentence of $500 in fines, six months in jail, or both. The Pennsylvania law provides an additional penalty. In our opinion it is about time this law was enforced. In the District of Columbia, for example, although it is their responsibility, the police refuse to do anything about enforcement, and the law is too much ignored elsewhere. A few parents taken to court to pay fines for offspring they have neglected to bring up properly would have a most salutary effect.

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Under the Microscope

By JULIAN D. CORRINGTON

PROGRESS IN ELECTRON MICROSCOPY

Since our first article on this subject, in the February, 1941, issue, the new science of magnification by means of a beam of electrons rather than a beam of light has gone ahead rapidly. While the fundamental principles have weathered a ten-year experimental period, there have been many and radical changes in design of the instrument as a whole, as well as of each of its parts. History has repeated itself here as in other fields: the first light microscopes were large and clumsy, the mechanical parts crudely machined, the optical parts uncorrected, the image distorted.

So with the electron microscope, the first models of which were enormous and heavy and with many and complex adjustments, operable only by the handful of research scientists, chiefly physicists, who had participated in their development. The RCA model described in our previous account was a tremendous improvement, yet appears very cumbersome alongside instruments made by either RCA or General Electric today, after but a scant four years of war-accelerated attack on such problems as smaller size, lighter weight, and, above all, simplicity and convenience of manipulation. Now anyone, after a short period of training, can operate one of these new models.

By way of illustration, let us look at the invasion of this field by the Electronics Department of General Electric, with some similar discussion to follow later concerning the latest RCA instruments. The laboratory model of the GE electron microscope measures approximately two by three feet by four feet high and is mounted on rollers for convenience of movement about the room. One sits in a chair before this machine, resting his arms on the large, flat working table and gazing into the eyepiece, at the correct height for the average person. There are four controls on the panel below the eyepiece—a main switch, a vacuum valve, a control for penetrating voltage, and a brightness control. The microscope can be plugged into any ordinary electrical outlet, from which the power unit yields voltages of 20 to 30 kv, giving a brightness on the fluorescent screen comparable to that produced by twice the voltage on older instruments. The GE electron illuminator eliminates the condenser lens and no adjustments of the filament or gun are necessary.

Viewing the image is accomplished by using a fluorescent screen that will transmit the picture to the exterior, where it may be photographed by any ordinary camera, using a Bausch & Lomb special 8X lens. This innovation did away with the necessity of a viewing window, to scan the screen internally, as well as with internal photography. Formerly there was an insertion chamber for the photographic plate, the electrons being directed at the plate itself for exposures. Doing away with this chamber in turn affected the size requirements for the main vacuum tube. With a small cylinder, a small pump sufficed, and this can produce the necessary vacuum in one to two minutes after changing objects; hence it was no longer essential to provide an air lock for removal or insertion of a specimen. It is a singularly interesting story, one simplification leading to another.

The base of the cabinet contains a single small rotary pump on vibration-proof supports, together with an air-cooled glass oil-diffusion pump. Above this is the power supply, and, mounted horizontally instead of the heretofore universal vertical arrangement, is the microscope itself. The lenses are electrostatic instead of electromagnetic, and are mounted in a single assembly termed the "lens package," less than ten inches in length! The most practical magnification determined for this microscope is 500X. When viewed or photographed through the 8X eyepiece, the final enlargement is 4000X, and, of course, the photograph can be further enlarged.

Not yet in production, this demonstration "Suitcase Model" of the electron microscope shows the compact instrument of the future.

Still more remarkable are two smaller and simpler designs. The Desk Model, here illustrated, has emerged from the experimental stage and will soon be shipped on high-priority orders to industrial and college laboratories who wish to obtain experience in the use of a simplified electron microscope and its applications to various research fields. The component parts are the same as in the laboratory instrument, but are housed in a desk design for convenience of operation.

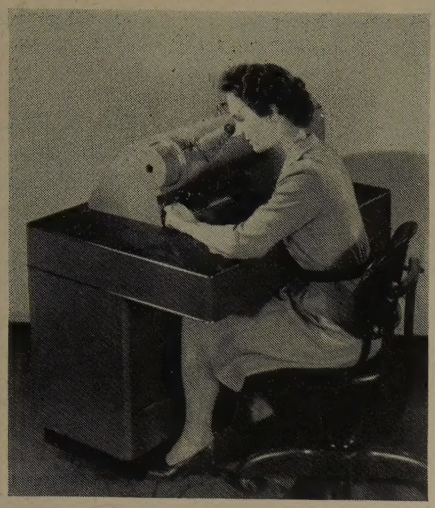
Not yet in production is the "Suitcase Model," shown here. Such a demonstration instrument has been exhibited several times this past year—for example, as shown in the accompanying picture, taken at a discussion of electron microscopy before the Radio Club of America, meeting at Columbia University in New York City. Left to right in the picture are: Dr. C. H. Bachman, of General Electric's electronics laboratory; Frank King, a director of the Radio Club of America; Igor Bensen, General Electric development engineer; and F. A. Klingenschmitt, president of the Club.

This unit brings us a step nearer to the day when a small, compact, and easily-operated electron microscope will be widely available to physicians and research men. The microscope proper weighs 78 pounds, while the vacuum pump, also of average suitcase size, weighs 55 pounds. Weight of the microscope can be reduced still further when certain lightweight alloys can be used to replace steel and other heavy metals used in this instrument at present. Such a portable microscope could, for example, be flown to and operated in field hospitals on the fighting fronts, and unquestionably will find many and increasing demands in the days to come.

BEGINNER'S PRIMER

After leaving the Beetles, in our survey of insect orders, we encounter several minor groups before coming to the next huge assemblage, the Lepidoptera. Of these lesser orders, two are worthy of inclusion in an entomological primer—the Mecoptera and Trichoptera.

The Mecoptera take their name from Greek roots meaning long wings. As is sometimes the case with scientific names, this term is not especially appropriate, as the wings are no more than moderately long, and may be reduced or even absent. The two pairs are similar, membranous, narrow, with numer-



A simplified table model of the electron microscope is in sharp contrast to the early versions.

ous cross veins, and are held either flat or roof-like when at rest. The body, legs, and antennae are long and slender: the abdomen is nearly cylindrical, with ten segments; the legs range from average to very long, with spurs on the ends of the tibiae, a tarsus of five segments, and either one or two claws; the antennae are filiform, with from 16 to as many as 50 segments.

The most constant and striking character, by means of which members of this order may be recognized, is the head, which is prolonged into a vertical beak, with slender mandibles located at the tip. Mouth-parts are of the chewing type, and the metamorphosis is complete, with caterpillar-like larvae.

Of the several genera, three may come to the notice of the beginner. The common name for the order is Scorpion-flies, although as a matter of fact, only males of the Family Panorpidae have the end of the abdomen curved and enlarged so as to suggest a scorpion. The resemblance is purely superficial; these insects do not sting or bite and are really among the most delicate and inoffensive of creatures. Their wings are usually yellowish, spotted with black; the claws are two in number and toothed. Scorpion-flies are to be sought along shaded streams and in damp woodlands, where they are seen at rest on the rank foliage. They feed on mites and small insects, as well as on fruits and flowers.

Bittacus, the second type, looks very much like a crane fly, but can be told by having two pairs of wings. It has the curious habit of hanging suspended by its forelegs, attached to a plant stem or leaf, and is found in the same situations as *Panorpa,* as well as in long grass. Another striking adaptation concerns the legs: the fourth and fifth segments of the tarsus are armed with fine teeth on their inner margins, and the fifth closes over the fourth like the blade of a pocket knife. With this device they capture insects that stray within their range, using any of the six legs, and reminding one of the predatory tactics of the praying mantis.

The genus *Boreus* includes certain minute insects known as snow scorpion-flies, living in moss, decayed wood, or under stones. They are wingless or have only wing vestiges, and hop in a manner to suggest tiny grasshoppers. Sometimes large numbers appear on snowfields in winter.

Caddis-flies belong to the Order Trichoptera (hair-wings). These comprise the largest order of aquatic insects and are certainly among the most striking and interesting of all members of the class—a statement that covers a good deal of territory! While there is some variation in most of the characters, a typical caddis-fly (also spelled caddice-fly) has four wings, the front pair longer, the hind pair wider, both pairs membraneous, and heavily clothed with long silky hair. Mouthparts are of the biting type, but are feeble to vestigial except for the prominent maxillary palpi. The antennae are long, filiform, and many-segmented, and the metamorphosis is complete, the aquatic larvae being known as caddis-worms.

The adults are dull colored, in shades of gray, brown, or smoky black, and generally resemble moths. Mostly they are nocturnal and are sometimes attracted to lights in great numbers. They frequent the vicinity of water and may be seen on quiet, warm evenings engaged in mating dances over ponds, rivers, and lakes. Chief interest, however, attaches to the larvae, most of which build cases in which they live and pupate. Each species makes a characteristic type of case. The materials used include silk alone or, more often, bits of sand, small stones, straws, twigs, wood, leaves, and other debris, cemented together and lined on the inside by silk. As with caterpillars, this secretion is a product of the salivary glands.

Students of pond life are familiar with the small log-cabins, straw-stacks, sand-grain houses, moss and leaf abodes, some decorated with snail shells, that at first sight appear to be no more than accumulations of trash, but which, if observed for a few minutes, will be seen moving in a slow and irregular fashion, crawling about over the pond floor. These are the caddis-worm cases, of multiple and intricate design. The head, thorax, and legs of the larva are armored and can be protruded from the case for crawling and food search; the abdomen is soft and remains inside.

Certain species, notably of *Hydropsyche,* dwell in swift water, even on the very brink of a falls, and construct nets instead of, or in addition to, cases. Some of these nets are objects of great and delicate beauty, and serve to entrap algae, insect larvae, and other small aquatic organisms as food.

Background for the Microscope

Equipment for the pursuit of microscopy may be as simple or as elaborate as individual inclinations dictate; but there is one item wholly indispensable —*books!* The microscope is handmaiden to all the sciences, and those who follow its adventuresome trail must have many a guide to direct along the right path.

Here is NATURE MAGAZINE'S selection of best bets. Check your library and add those that fail to answer the roll call. Buy one each month, or as often as you can. Suggest them as gifts. Buy them for the relative or friend whose chief joy is working with his microscope. Entries will be changed periodically; here is a basic list for a starter:—

MICROSCOPE

The Microscope, by S. H. Gage; 17th ed., most celebrated American work; very thorough.....$4.00

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Working with the Microscope, by J. D. Corrington; New guide for self help or classroom with graded series of lessons, from single to advanced. $3.50

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Slide preparations representing these orders do not differ from the customary mounts previously discussed, and should include whole mounts of small larvae and adults, antennae, head of a scorpion-fly, wings, and legs. Our next chapter will take up that great assemblage, the Order Lepidoptera, the moths, skippers, and butterflies.

AMERICAN SOCIETY OF AMATEUR MICROSCOPISTS

Change in Officers

As of July 1 this year, the office of Permanent Secretary of the A. S. A. M. passed to Mr. Herman W. Fowler, 2729 Connecticut Ave., Pittsburgh 16, Pa. Dr. Corrington retains a connection with the organization he founded five years ago by assuming the position of President, and will continue to function also as Editor of the *Bulletin*.

As members and many readers who are non-members know, this Society was founded as an outgrowth of the interest expressed in this Department, and has been a one-man affair since its inception in March, 1939. During this period the membership has grown to more than 1300, worldwide in distribution, and with fourteen chartered Chapters. The duties of management and especially of correspondence have become so heavy that they can no longer be handled satisfactorily by one person in his spare time. Pending further changes looking toward a larger staff, Mr. Fowler has volunteered to step into the breach and shoulder the bulk of the labor.

The new Secretary earns his bread and butter at the Pittsburgh Central Office of the Bell Telephone Company of Pennsylvania. He has been a most enthusiastic member of the A. S. A. M. for four years and, during much of that time, has served most ably as Secretary of the Pittsburgh Chapter.

Dr. Corrington has received an appointment to the Faculty of the University of Miami, and has moved to Florida, where his residence address is 760 Valencia Ave., Coral Gables.

Applications for membership and all correspondence having to do with the A. S. A. M. should be addressed to Mr. Fowler; articles for the *Bulletin* and correspondence pertaining to this Department, other than A. S. A. M. matters, to Dr. Corrington.

TRADE NOTES

One of the best known and most successful college botanies is *A Textbook of General Botany*, by Smith, Gilbert, Evans, Duggar, Bryan, and Allen, now in its fourth edition. Certain changes in the list of former authors is to be noted, owing to the death of Professor Overton and the withdrawal of Professor Denniston; many parts have been extensively revised, the chapter on Myxomycetes has been restored, economic botany has been treated in with other material instead of separately, new chapters have been added on plant pathology and paleontology, and illustrations revised and added.

Beginning with a brief discussion of the sunflower as a familiar plant, work proceeds through cells to plant parts and functions, then classification, systematic botany, plant fossils, inheritance and variation, evolution, and geography. The material is thus very complete; the authorship thorough, exact, interesting; the illustrations among the best to be found in any college text. This book, the first edition of which appeared in 1924, has met with well deserved success and promises to carry on among that small and select list of biological texts that hold their own through successive generations with the hosts of newer works. Herewith, too, some specimens of *Orchis* to the publishers for excellence of format, printing, and binding. Pp. x, 668; frontis., figs. 459, 4 in full color. The Macmillan Co., 60 Fifth Ave., New York 11, 1942. $4.00.

Ward's Natural Science Establishment, Inc., P. O. Box 24, Beechwood Station, Rochester, N. Y., has recently issued an illustrated 16-page booklet entitled, "An Aid to the Diagnosis of Helminths Parasitic in Humans." Copies are priced at 25c each or $2.50 in dozen lots. The text is written by Dr. Robert L. Roudabush, head of Ward's Microscope Slide Department, and the photographs are by Theodore Romaniak, staff photographer at Ward's. Eggs are described and illustrated and there is a section on technique. A valuable addition to your library if you are at all interested in parasitology.

Virus Diseases

Virus Diseases in Man, Animal and Plant. By Gustav Seiffert. New York. The Philosophical Library. 1944. 332 pages. $5.00.

This is a survey and report, published on the recommendation of the National Research Council, covering the major research work done during the past decade in the field of the virus diseases. This is a book for the scientist and physician.

Aristotle

Aristotle: Generation of Animals. Translated by A. L. Peck. Harvard University Press, Cambridge, Mass. (Loeb Classical Library.) 608 pages. $2.50.

Of Aristotle's four great biological works, this is perhaps the most interesting for modern naturalists because it anticipates so many of the recent developments in embryological researches. We may think of Aristotle's work as a collection of quaint errors, but his real discoveries were more remarkable than his mistakes—indeed some of his observations are still to be verified by modern students. Many of these discoveries—the distinction between oviparous and oviviparous, and the sperm carrying arm of the octopus, for example, are described in this treatise, which also includes much of the essential matter of Aristotle's theories and philosophy of life. The Loeb Classics, which include the best available texts, should need no introduction, but this volume is an especial prize for naturalists because of the excellent critical introduction, notes and appendices which the translator has provided.

J. W. HEDGPETH

Dyes of Old

Ancient and Medieval Dyes. By William F. Leggett. Brooklyn, N. Y. 1944. The Chemical Publishing Company. 94 pages. $2.25.

This is an interesting popular discussion of the source, use and economic importance of the vegetable and mineral dyes of ancient and medieval days. Mineral dyes were little used by the ancients, or in the Middle Ages. In this little book we learn such interesting things as that the red coats of the British soldiers and the red hunting jackets of the fox hunters, as well as the red pants and caps of the French soldiers, were red because their respective kings ordered it to promote the madder-growing industry from which the red dye came. The principal vegetable dyes discussed are madder, indigo, woad, saffron and safflower. Others are weld, brazilwood, logwood, barwood, camwood, the fustics, orseille, annatto, turmeric, cutch, gambir and quercitron. The animal dyes are Tyrian purple, kermes, cochineal and lac. The history of most of them, and their place in early days, are fascinating.

Johnsonia Again

Number 13 of *Johnsonia* adds thirty-two pages to this cumulative periodical on shells published by the Department of Mollusks, Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts. This latest addition deals with the Family Cardiidae in the western Atlantic and is the work of W. J. Clench and L. C. Smith. These are the true cockle shells of heart clams, a family of many species and world-wide distribution.